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ROYAL BOTANIC GARDENS, KEW

XXVIII—NOTES ON THE TRINIDAD AND TOBAGO SPECIES OF LAURACEAE.

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This family, known as the " Lauriers " in Trinidad, is of considerable interest to the Forest Officer, on account both of its economic value as providing useful soft woods and of its general prevalence. Considerable confusion prevails locally with regard to the native names, several species on the one hand being given the same name, and more than one name on the other hand being given to a single species ; again a species having one name in the north of the island may have a different name in the south. The standardization of the local nomenclature is therefore desirable. With regard to scientific nomenclature, there is no more recent botanical account than that contained in Mez's monograph on the American Lauraceae (1889), and this publication (in the Jahrbuch des königlichen botanischen Gartens) is not generally accessible ; further, since the publication of this work, many additional species have been found, some of which are new to science.

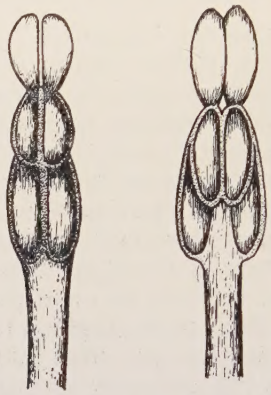
The present investigation has been carried out at the Imperial Forestry Institute, Oxford, and in Trinidad. The writer is deeply indebted to the Director of the Royal Botanic Gardens, Kew, for the loan of the Trinidad specimens in the Kew Herbarium, and of types from elsewhere, and to Mr. N. Y. Sandwith of the Herbarium staff, both for the trouble he has taken in selecting the material and for various notes based on his experience of the West Indian flora, which materially helped to avoid confusion and error. The writer wishes, also, to record his grateful thanks to Dr. Burtt Davy, Lecturer in Tropical Forest Botany at the Imperial Forestry Institute, for his very necessary direction, control and supervision of this paper, and to Mr. A. C. Hoyle, Demonstrator in Botany at the Imperial Forestry Institute, who checked the descriptions of the species ; also to the Sherardian Professor of Botany for the loan of books from the Oxford Botanic Gardens Library ; and finally to Mr. R. O. Williams, Economic Botanist of Trinidad and Tobago, for considerable assistance with the Trinidad Herbarium specimens.

This investigation, carried out mainly on herbarium material, has emphasized the necessity for more field work on this difficult family. Many of the specimens in herbaria are incomplete, representing only one sex, and the range and variations in leaf size, shape

and nervation require careful study. Until, however, an investigation has been made of the types of the species recorded, there can be no background for field work.

Ocotea arenaensis is a new species, and *Phoebe elongata* vars. *elliptica* and *elongata* are two new varieties, published here for the first time.

Note.—* in the text denotes introduced species. Unless otherwise stated, the specimens cited are in the Herbarium at Trinidad. "*T.H.*" following a number of a specimen indicates that the number is that of the Trinidad Herbarium and not of the collector whose name precedes the number.



Stamens of *Phoebe* (left, × 40), and *Persea* (right, × 32), showing the difference in the arrangement of the locules.

KEY TO THE GENERA OF TRINIDAD LAURACEAE.

a. Trees or shrubs, *b*.
  b. Anthers 2-locular, *c*.
    c. Two outer rows of stamens perfect (in the Trinidad species); innermost row (staminodia) large, foliaceous.....1. *Aiouea*.
    c. Three outer rows of stamens perfect; innermost row (staminodia) abortive or stipitiform.....2. *Aniba*.
  b. Anthers 4-locular; perfect stamens 9; fruiting perianth enlarged or more or less unchanged, *d*.
    d. Leaves tripli- or subtriplinerved, *e*.
      e. Leaves opposite.....3. *Cinnamomum*.
      e. Leaves alternate, *f*.
        f. Leaves glandular in nerve axils.....3. *Cinnamomum*.
        f. Leaves eglandular in nerve axils.....7. *Phoebe*.
    d. Leaves penninerved, *g*.
      g. Fruiting perianth enlarged; perianth segments deciduous, *h*.
        h. Anther locules superimposed in pairs.....4. *Ocotea*.
        h. Anther locules spreading into a bow in a single row. 5. *Nectandra*.

g. Fruiting perianth tube only slightly enlarged, *i*.

i. Perianth segments deciduous; lower locules of the anthers touching the upper at their side (see figure)..... 6. *Persea*.

i. Perianth segments persistent; lower locules of the anthers touching the upper at their base (see figure) 7. *Phoebe*.

a. Stems twining, filiform, aphyllous.....8. *Cassytha*.

1. Aiouea *Aubl.* Pl. Guian. i. 310, t. 120 (1775).

Tree. *Leaves* glabrous, shining, coriaceous, penninerved. *Flowers* hermaphrodite. *Panicles* axillary or subterminal, loose. *Perianth-tube* ovoid or subcampanulate, segments 6, subequal. *Perfect stamens* 6, those of the first and second series (more rarely those of first series only) with short or fairly long eglandular filaments and 2-locular introrse anthers. *Staminodes* of the third series narrow with 2 large glands at the base, more rarely imperfectly 1–2-locular towards the apex; staminodes of the fourth series ovate-triangular subsessile or more rarely 0. *Ovary* included in the perianth-tube; style more or less exserted. *Fruit* a berry, ovoid or oblong, seated on the pedicel which is thickened, usually obconical, and crowned with the hardened remains of the perianth.

Key to Species.

a. Pedicels and perianth puberulous; pedicels 2–3 mm. long. 1. *densiflora*.

a. Pedicels and perianth glabrous; pedicels 3·5–7 mm. long; perianth glaucescent when dry.....2. *Schomburgkii*.

1. **Aiouea densiflora** *Nees* in Linnaea, xxi. 513 (1848).

Tree. Branchlets early glabrescent: leaves 12–23 cm. long, 3·5–8 cm. broad, oblong or elliptic-oblong to elliptic-ovate, coriaceous, glabrous on both surfaces; above shining with mid-rib prominent and primary nerves elevated, veins flat or slightly impressed, not very conspicuous; beneath nerves prominent and veins prominulous; apex usually subacutely or bluntly acuminate, more rarely obtuse, base cuneate; petiole up to 2·5 cm. long, channelled: panicles up to 13 cm. long, mostly shorter than or subequal to the subtending leaves, glabrescent: pedicels 2–3 mm. long, longer than the flowers: calyx 1·5 mm. diam.: fruit an ovoid berry about 14 mm. long and 13 mm. diam. seated on the enlarged obconical pedicel, which is about 8 mm. diam. at apex, crowned with the hardened remains of the perianth.

TRINIDAD: locality and collector unknown, 631 *T.H.*!; Latria, near Merrimac, 29 April, 1865, collector not stated, 2732 *T.H.*!; Mayaro, fruiting, March, *Broadway*, 12208 *T.H.*!; Arena Reserve, *Brooks*, 12556 *T.H.*!; Southern Watershed Reserve, *Russell*, 12598 *T.H.*!

Local name (Siparia); *Laurier canelle*.

The type is from Guiana.

2. **Aiouea Schomburgkii** *Meissn.* in DC. Prodr. xv. pt. 1, 82 (1864).

Tree. Branchlets glabrous: leaves up to 24 cm. long, 7 cm. broad, elliptic, oblong-elliptic, or elliptic-obovate, thinly coriaceous, both surfaces glabrous; nerves and veins prominulous on both surfaces, reticulation lax; apex caudate- or shortly and bluntly acuminate, base cuneate; petiole up to 3·5 cm. long, those of young leaves pink on upper surface: panicles up to 26 cm. long, lax, glabrous: pedicels 3·5–7 mm. long about three times as long as the flowers, slender, spreading: flowers hermaphrodite, greenish-yellow when fresh, glaucescent when dry: calyx 1–1·5 mm. diam., lobes broadly ovate or suborbicular, rounded to obtuse, glabrous: fruit an ovoid berry about 12 mm. long and 8 mm. diam., seated on the enlarged obconical pedicel, which is about 7 mm. diam. at the apex and crowned with the hardened remains of the perianth.

TRINIDAD: 9½ Mile Arima-Blanchisseuse Road, *Brooks*, 12477 *T.H.* !, 12573 *T.H.* !, and 12599 *T.H.* !.

Local name: *Laurier pulcherro.*

Also in British Guiana.

2. Aniba *Aubl.* Pl. Guian. i. 327 (1775).

Trees. Leaves sparse, coriaceous, penninerved. *Flowers* hermaphrodite or unisexual, sometimes bracteate. *Panicles* pedunculate, shorter than the leaves, axillary or sub-terminal, or aggregated on dwarf arrested axillary shoots. *Perianth-tube* more or less thick, sometimes at length narrowed at apex; segments 6, subequal. *Perfect stamens* 9 (see note *A. megacarpa*), the 1st and 2nd series eglandular with introrse 2-locular anthers, the 3rd series 2-glandular at the base with extrorse 2-locular anthers, staminodes of the 4th series small or wanting. *Ovary* included in the perianth tube, the style exserted. *Fruit* a berry, included at first in the subglobose perianth tube, later exserted, enclosed at the base by the enlarged, indurated, cupulate, truncate perianth-tube; perianth segments persistent or deciduous.

Key to Species.

a. Fully developed leaves glabrous on both surfaces, *b.*
  b. Veins on upper surface delicate, indistinct; leaves oblong, elliptic oblong or oblanceolate, thinly coriaceous, petioles usually reddish-brown.....1. *trinitatis.*
  b. Veins on upper surface prominent, distinct, leaves usually obovate or oblanceolate, rigidly coriaceous.....2. *megacarpa.*
a. Leaves minutely puberulous beneath at least on midrib and nerves, becoming furfuraceous-tomentellous when dried: leaves oblong, slightly obovate or oblanceolate, petioles usually light brown .....3. *panuriensis.*

1. **Aniba trinitatis** (*Meissn.*) *Mez* in Jahrb. Bot. Gart. Berl. v. 68 (1889).—*Aydendron trinitatis* Meissn. in DC. Prodr. xv. pt. 1, 91.

Aydendron citrifolium Griseb. Flora B.W.I. 284 (1864), not of Nees (1836).

Tree. Branchlets reddish brown, glabrescent : leaves mostly 9–18 cm. long, 2·5–6 cm. broad, oblong, elliptic oblong or oblanceolate, rather thinly coriaceous, glabrous on both surfaces, above primary nerves flat or slightly prominulous, veins inconspicuous, delicate, beneath nerves and veins prominulous ; apex bluntly acuminate, base cuneate ; petiole up to 1 cm. long, reddish brown, deeply channelled : panicles mostly 5–6 cm. long, shorter than the leaves, fascicled or aggregated on dwarf arrested axillary shoots, puberulous : pedicels usually longer than the flowers ; flowers hermaphrodite : calyx 2 mm. diam., lobes concave-ovate, obtuse or sub-acute : ovary included in the perianth tube ; style exserted : fruit a berry about 1·7 cm. long, ellipsoid ; cupule cup shaped, up to 1 cm. long and 1 cm. diam.

TRINIDAD : St. Ann's, *Crueger* 59 (in Kew Herb., type number !) ; collector and locality not stated, 628 *T.H.* ! ; Aripo Savannah, *D.W.A.*, 5096 *T.H.* ! ; Maracas Bay, *Dannouse*, 6426 *T.H.* ! ; locality not stated, *Marshall*, 11622 *T.H.* ! ; 2¾ mile, Cumuto-Tumpuna Road, *Brooks*, 12465 *T.H.* !

Irois, *Crueger*, 121 *T.H.* ! ; 6 Mile, Mora Forest, *Marshall*, 11256 *T.H.* ! ; Arena Reserve, *Brooks*, 12149 *T.H.* ! ; locality not stated, *Brooks*, 12597 *T.H.* !, probably belong here, but material is insufficient for accurate determination. A specimen from Carenage, Beard's property, " tree, fruit white, succulent," Aug. 23, 1920 (not fruiting) *Broadway* 7187 ! in Kew Herb. must belong here, but the calyx tube appears longer than in typical specimens, the calyx segments have flattened, and the torus with androecium appears to have elongated (perhaps representing the development of the ovary ?) ; also the petiole is longer.

Local name : *Laurier canelle.*

2. **Aniba megacarpa** *Hemsl.* in Hook. Ic. Pl. xxviii. tt. 2751, 2752 (1905).

Tree. Branchlets glabrous : leaves 7–13 cm. long, 3·5–6·5 cm. broad, on young branchlets subopposite and clustered at apices, obovate or obovate-oblong, oblanceolate or sometimes almost elliptical, rigidly coriaceous, glabrous on both surfaces, glaucous and shining above, nerves and reticulation prominent above and beneath ; apex rounded or abruptly and bluntly cuspidate, base cuneate ; petiole up to 1·3 cm. long : panicles 2–4 cm. long, shorter than the leaves, axillary or sub-terminal, often fascicled, puberulous : flowers unisexual ; bracts oblong or ovate, puberulous, caducous ; perianth about 2 mm. diam., globose, tube very thick, lobes 6 inflexed, 2-seriate, rotund ; fully developed stamens and staminodes not seen ; ovary completely enclosed in perianth : fruit about 8 cm. long, oblong, glabrous, half-exserted : cupule about 5 cm. diam., thick, lobed, and prominently warted ; pedicel enlarged.

TRINIDAD : *Dannouse*, 6786 *T.H.* (in Kew Herb., type !)

Top of Arima-Blanchisseuse Road, *Marshall*, 12131 *T.H.* !, and 9½ mile, Arima-Blanchisseuse Road, *Brooks*, 12487 *T.H.* ! almost certainly belong here, but further material is required. Fresh material, with mature flowers, is required, in order to determine the genus of this species with certainty. "I am not quite certain as to the composition and structure of the androecium" (*Hemsley*). "Tree 60 feet or more in height, yielding valuable yellow timber, called Laurier Matac" (*Hart*).

Local name : *Laurier pulcherro.*

3. **Aniba panurensis** *Mez* in Jahrb. Bot. Gart. Berlin, v. 58 (1889). —*Aydendron panurense* Meissn. in DC. Prodr. xv. pt. 1, 89 (1864).

Tree. Branchlets rusty tomentellous : leaves about 6·5–20 cm. long, 2·5–6·5 cm. broad, oblong- or elliptic- oblanceolate to obovate, coriaceous, above glabrous, with midrib, nerves and reticulation more or less flat ; beneath minutely puberulous at least on midrib and nerves, becoming rusty furfuraceous when dry, with midrib, nerves and reticulation prominent ; primary nerves 8–12 on each side of the midrib ; apex acuminate, base cuneate ; petiole up to 1 cm. long, channelled : panicles up to about 10 cm. long, rusty tomentellous : pedicels often longer than the flowers : flowers hermaphrodite ; calyx about 2 mm. diam., lobes oblong-ovate, sub-acute, rusty ; ovary included in perianth-tube ; style exserted : fruit a berry, ellipsoid, about 18 mm. long ; cupule about 1 cm. diam., cup shaped, warty, covering about ⅓ of the berry.

TRINIDAD : Maraval, *Baptiste*, 5876 *T.H.* ! ; locality and collector not stated, 6899 *T.H.* ! ; road to Maracas Bay, *Williams, Freeman, Cheeseman*, 11242 *T.H.* ! ; summit of Pigeon Hill, Tobago, *Freeman, Williams*, 11366 *T.H.* ! ; Arena Reserve, *Brooks*, 12458 *T.H.* !, 12584 *T.H.* !

Maraval, collector not stated, 5819 *T.H.* !, and Arima, *Dannouse*, 8901 *T.H.* ! probably belong here, but the material is insufficient for accurate determination.

The leaves when crushed and the fruit have a pleasant smell of spices.

Local name : *Laurier canelle.*

Widely distributed in tropical South America.

3. *Cinnamomum *Spreng.* Anleit. ed. 2, i. 340 (1817).

Trees. Leaves opposite or alternate, tripli- or sub-triplinerved. *Flowers* hermaphrodite or polygamous by abortion. *Panicles* axillary or sub-terminal. *Perianth-tube* short with 6 sub-equal segments. *Perfect stamens* 9 ; 1st and 2nd series eglandular, with introrse 4-locular anthers ; the 3rd series 2-glandular at the base, glands subsessile, anthers 4-locular, extrorse ; staminodes of the 4th series sagittate. *Ovary* sessile, narrowing into the style ; stigma discoid. *Fruit* "a berry supported by a 6-fid or subtruncate hardened cupule."

Key to Species.

a. Leaves opposite, usually markedly triplinerved; nerve axils eglandular; petioles about 1 cm. long, stout..... 1. *zeylanicum*.

a. Leaves alternate, tripli- or sub-triplinerved; nerve axils often glandular; petioles 2 or more cm. long, slender.....2. *Camphora*.

1. ***C. zeylanicum** *Nees* in Wall. Pl. As. Rar. ii. 74, iii. 32.

Tree. Branchlets glabrous: leaves 5–15 cm. long, 2·5–6 cm. broad, ovate or oblong, rigidly coriaceous, glabrous, glaucous and shining above, glabrous beneath; nerves on upper surface 3, impressed, beneath prominent and reticulation sub-prominent; apex obtuse or sub-acute, base cuneate or more or less rounded; petioles up to 1·5 cm. long: panicles up to about 21 cm. long, more or less shortly sericeous, often longer than the leaves: flowers whitish yellow; calyx 5 mm. diam., lobes oblong-obovate, bluntly acuminate: fruit "a berry, ovoid-oblong"; cupule 8–10 mm. diam.; perianth-segments persistent in fruit.

India: Madras Herb. 9570 ! in Kew Herb.

Trinidad (cultivated): St. Ann's, *Broadway* 5272 in Kew Herb. !; Experiment Station St. Clair, *Hasnali*, 8190 *T.H.* !; "Hort. Trin," *Hart*, 4679 *T.H.* !, 5510 *T.H.* !, 5953 *T.H.* !.

Grenada: 5637 *T.H.* !

2. ***C. Camphora** *Nees et Eberm.* Handbk. Med. Pharm. Bot. ii. 430.—*Camphora Camphora* (L.) Karst.

Tall tree. Branchlets at first finely puberulous, early glabrescent; buds tomentellous, glutinous: laminae 5–11 cm. long, 3–5 cm. broad, broadly elliptic, tapering to both ends, coriaceous, glabrous or minutely puberulous above, glabrous or tomentellous beneath; nerves prominent and reticulation areolate on both surfaces; nerve axils often glandular; apex acuminate, base cuneate; petioles up to 3 or more cm. long: panicles up to 8 cm. long, pubescent, glabrescent: pedicels sub-equal to or longer than the flowers: calyx 5 mm. diam.: lobes oblong-obovate, acute or obtuse: fruit a drupe "the size of a large pea"; cupule about 5–6 mm. diam. (larger when mature?), saucer-shaped.

China: Shanghai, *T. E. Bullock* 49 ! in Kew Herb.; Bing-jao, Che Kiang, *W. R. Carles* 174 ! in Kew Herb.

Trinidad (cultivated): Royal Botanic Gardens, *Freeman*, 8346 *T.H.* !, 8347 *T.H.* !, 8348 *T.H.* !; St. Augustine, *Freeman*, 8866 *T.H.* !, 8867 *T.H.* !; St. Augustine, *Brunton*, 9109 *T.H.* !; without locality, 625 *T.H.* !; "Hort. Trin.", *Hart* 4680 *T.H.* !

4. Ocotea *Aubl.* Pl. Guian. ii. 780 (1775).

Trees. *Leaves* alternate or scattered, coriaceous, penninerved. *Flowers* 1- or 2-sexual; sexes dioecious (polygamo-dioecious?). *Panicles* axillary or subterminal, pedunculate, lax or in small cymes, or with flowers contracted almost into heads, puberulous

or tomentose. *Peranth-tube* usually short, with 6 subequal segments. *Perfect stamens* 9; 1st and 2nd series eglandular, with introrse 4-locular anthers, the anther-locules superimposed in pairs; 3rd series 2-glandular at the base, with extrorse 4-locular anthers; staminodes of 4th series 0 (? in all species). *Ovary* more or less sunk in the perianth-tube, narrowing into the style; in ♂ flowers narrow and functionless. *Fruit* a berry, globose, ovoid or oblong, when young sometimes included in the perianth-tube, but exserted when ripe, seated on, or enclosed at the base by, the perianth-tube which is enlarged, hardened, cup-shaped or expanded, truncate, with deciduous segments.

Key to Species.

a. Under surface of fully developed leaves glabrous or at least not hairy, *b*.
  b. Nervation of upper surface of leaves more or less impressed; venation not areolate.....1. *leucoxylon*.
  b. Nervation of upper surface of leaves slightly prominent, venation areolate.....2. *arenaensis*.
a. Under surface of fully developed leaves hairy at least on midrib or in axils of primary nerves, *c*.
  c. Nerve axils (at least the lower) on under surface barbellate and foveolate, *d*.
    d. Primary nerves 4–6 on each side; panicles appressed puberulous ..... 3. *Eggersiana*.
    d. Primary nerves more numerous; panicles pubescent..... 4. *fasciculata*.
  c. Nerve axils of leaves on under surface not barbellate or foveolate, *e*.
    e. Midrib markedly impressed above; primary nerves comparatively indistinct on upper surface...5. *canaliculata*.
    e. Midrib not markedly impressed above; primary nerves distinct on upper surface, *f*.
      f. Branchlets rusty pilose or tomentose, *g*.
        g. Under surface glaucous, the chief veins not more marked than the white finely areolated reticulation... 6. *glomerata*.
        g. Under surface not glaucous, the chief veins markedly parallel and reticulation lax.....7. *oblonga*.
      f. Branchlets appressed puberulous.....1. *Leucoxylon*.

1. **Ocotea leucoxylon** (*Sw.*) *Mez* in Jahrb. Bot. Gart. Berl. v. 329 (1889).—*Laurus leucoxylon* Sw. Prodr. 65. *Oreodaphne leucoxylon* (Sw.) Griseb. Fl. B.W.I. 283 (1864).

Tree. Branchlets appressed puberulous towards apex; leaves 7–24 cm. long, 3–9 cm. broad, oblong to ovate-oblong or elliptic, coriaceous, glabrous above; under surface minutely furfuraceous but not hairy, except when young; nerves more or less flat and veins flat or impressed on upper surface, prominulous beneath, apex

acute or shortly and subacutely acuminate, base cuneate or rarely more or less rounded ; petiole up to 1·5 cm. long : panicles up to about 17 cm. long, shorter than or subequal to the leaves, more or less rusty-puberulous : pedicels subequal to the flowers : sexes dicœceous : calyx 2 mm. diam., lobes ovate-oblong, blunt ; staminodes in ♀ flower minute, in ♂ flower wanting : fruit a globose, mucronate berry, nearly 1 cm. long ; cupule 5–7 mm. diam., saucer-shaped ; pedicel somewhat thickened ; both cupule and pedicel dotted with warts.

TRINIDAD : Blanchisseuse, *Broadway* 5982 in Kew Herb. ; Heights of Aripo, *Broadway*, 9872 *T.H.* !, and 10017 *T.H.* ! ; Morne Bleu, *Freeman, Williams*, 11966 *T.H.* ! ; Arena Reserve, *Brooks*, 12148 *T.H.* ! ; Northern Range Reserve, *Brooks*, 12489 *T.H.* !

Morne Bleu, *Freeman*, 9588 *T.H.* ! and Guapo, *Dannouse*, 12212 *T.H.* ! almost certainly belong here.

TOBAGO : Pigeon Hill, *Freeman, Williams*, 11364 *T.H.* ! ; Salem, Charleston Trace, *Williams*, 11789 *T.H.* ! ; Roxborough, *Franklyn*, 11905 *T.H.* !

JAMAICA : *W. Harris* 5229 !, 5466 !, 10963 ! in Kew Herb.

Local names : *Duckwood, Black Cedar.*

Also recorded by Mez from Cuba, St. Domingo, Porto Rico, St. Thomas and Martinique.

Tree yielding good timber much used in Tobago.

2. **Ocotea arenaensis** *R. L. Brooks*, sp. nov. ; affinis *O. floribundae* Mez, sed floribus magis agglomeratis pedicellis brevioribus, floris ♂ ovario rudimentario dense pubescente, stigmate minore differt.

Tree. Branchlets puberulous, early glabrescent : leaves 6–17 cm. long, 2–7·5 cm. broad, elliptic or obovate, coriaceous, glabrous above, densely and minutely lepidote beneath, but not puberulous except when young ; veinlets above areolate ; nerves and veins beneath prominulous ; apex very shortly and broadly acuminate ; base cuneate ; petiole up to 7 mm. long : panicles up to about 10 cm. long, puberulous : pedicels shorter than the flowers : sexes dioecious (or polygamo-dioecious ?) : calyx 3 mm. diam., lobes ovate, obtuse ; staminodes in ♂ flower 0 ; rudimentary ovary densely pubescent ; stigma comparatively insignificant ; ♀ flower not seen : fruit a globose berry seated on a shallow saucer-shaped or flattened discoid cupule of about 6 mm. diam. ; pedicel enlarged and hardened.

TRINIDAD : Arena Reserve, May 23, 1929, *Jeanpierre*, 12154 *T.H.* ! (type in Kew Herb.), and May 15, 1929, *Brooks*, 12147 *T.H.* ; Siparia Reserve, *Russell*, 12619 *T.H.* !

Differs from *O. floribunda* Mez, to which it is closely allied, in having the rudimentary ovary of the ♂ flower densely pubescent, with a comparatively small and insignificant stigma, and flowers more congested with shorter pedicels, but further material is required in order to ascertain the constancy of these characters, and any other points of difference. Yields good timber, much used in internal

construction ; the wood when freshly cut, and the leaves when crushed have a strong unpleasant scent.

Local names : *Laurier mattack, Laurier Siparia fine leaf.*

3. **Ocotea Eggersiana** *Mez* in Jahrb. Bot. Gart. Berlin v. 363 (1889).

Tree. Branchlets tomentellous, glabrescent : leaves 6–12 cm. long, 2–5 cm. broad, elliptic or obovate-elliptic, coriaceous ; mature leaves glabrous or furfuraceous above, appressed puberulous (later furfuraceous) beneath, some nerve axils barbellate and foveolate on lower surface ; midrib on both surfaces (especially at the base) usually warty ; primary nerves 4–6 on each side of the midrib and more or less flat above, prominent beneath, reticulation sub-prominent beneath ; apex bluntly caudate-acuminate, base cuneate ; petiole up to 8 mm. long : panicles up to about 7 cm. long, appressed puberulous : pedicels subequal to or shorter than the flowers, slender : flowers dioecious ; calyx about 4 mm. diam., lobes ovate-oblong, obtuse : berry ellipsoid 8 mm. long, 4 mm. diam. (mature fruit not seen ?) ; cupule about 5 mm. diam. cup-shaped covering half the berry ; pedicel enlarged and hardened in fruit.

TRINIDAD : Aripo, *D.W.A.*, 5106 *T.H.* ! ; top of Tucuche, *Williams*, 10119 *T.H.* ! ; Morne Bleu, *Freeman and Williams*, 11960 *T.H.* ! ; Arena Reserve, *Marshall*, 12133 *T.H.* ! ; Arena Reserve, *Brooks*, 12150 *T.H.* ! ; Toco Road, *Andrews*, 12317 *T.H.* ! and 12324 *T.H.* ! ; Arena Reserve, *Brooks*, 12334 *T.H.* !, 12460 *T.H.*! and 12457 *T.H.* !.

In our Trinidad tree the slender, puberulous panicles, and the leaves which sometimes tend to be obovate, differ from the stouter tomentose panicles and ovate leaves in the description of *O. Eggersiana* Mez.

Local name : *Laurier mattack.*

Distribution : Guadeloupe to Trinidad.

4. **Ocotea fasciculata** (*Nees*) *Mez* in Jahrb. Bot. Gart. Berl. v. 248 (1889).

Tree. Branchlets appressed pubescent, becoming puberulous : leaves 6–12 cm. long, 2–3·5 cm. broad, elliptic- or oblong-lanceolate, coriaceous, upper surface glabrous, under surface furfuraceous, glabrous except in lower nerve axils which are usually barbellate and foveolate ; primary nerves usually 7 or more on each side, like the midrib slender and prominent above ; reticulation distinctly areolate ; apex bluntly acuminate, base slightly cuneate ; petiole up to 1 cm. long : panicles up to about 6 cm. long, apparently fasciculate on dwarf axillary shoots, shorter than the leaves, more or less silky puberulous : pedicels at length longer than the flowers : flowers hermaphrodite (or polygamo-dioecious ?) : calyx 3–4 mm. diam., lobes oblong-ovate, obtuse ; staminodes 0 : mature berry not seen by me ; cupule warty cup shaped, 1 cm., covering half the berry in immature fruit ; fruiting pedicel enlarged and hardened.

Trinidad: Maraval, *Dannouse*, 1299 *T.H.*!; locality not stated, 1457 *T.H.*!; Hort. Trin., *Broadway* 2192!; Hort. Trin., 4399 *T.H.*!; Mount St. Benedict, *Hunter*, 12123 *T.H.*!; Catshill Reserve, *Gooch and Swabey*, 12545 *T.H.*!.

Also in British Guiana (*Schomburgk* 928/1286! type coll.), Venezuela and Brazil.

5. **Ocotea canaliculata** (*Rich.*) *Mez* in Jahrb. Bot. Gart. Berl. v. 361 (1889).—*Laurus canaliculata* Rich. in Act. Soc. Hist. Nat. Paris, 1792, 108. *Oreodaphne cayennensis* Meissn. in DC. Prodr. xv. pt. 1, 133; and in Mart. Fl. Bras. v. pt. 2, 232, *fide* Mez.

Tree. Branchlets brown, appressed greyish or ferruginous tomentose, glabrescent: leaves 5–13 cm. long, 2–3·5 cm. broad, oblong- or elliptic-lanceolate, coriaceous, glabrous above, glaucous and puberulous beneath; primary nerves about 1 cm. apart in full-sized leaves, indistinct above and with midrib impressed, midrib and nerves prominent below; reticulation subprominent on both surfaces; apex gradually or obtusely acuminate, base cuneate; petiole 5–15 mm. long: panicles up to about 7 cm. long, rusty tomentose, spreading: pedicels equal to or shorter than the flowers: flowers hermaphrodite (polygamo-dioecious?); calyx 2–3 mm. diam., lobes ovate or oblong, obtuse or rounded, rusty tomentose without; staminodes 0: berry ellipsoid 1 cm. long, 8 mm. diam.; cupule about 1 cm. diam., cup-shaped, covering about half the berry; fruiting pedicel enlarged and hardened.

Trinidad: Maracas, *Crueger* 119! in Kew Herb.; Arima-Blanchisseuse Road, *Marshall*, 12130 *T.H.*!; Diego Martin, *Dannouse*!; 11 Mile, Arima-Blanchisseuse Road, *Brooks*, 12478 *T.H.*!

Mora forest, *Freeman*, 11257 *T.H.*! may belong here but material is insufficient. The type is from the River Para in French Guiana (in Herb. Vahl, in Herb. Haun.).

Local name: *Laurier petite-feuille.*

Occurs also in Brazil, according to Mez.

6. **Ocotea glomerata** (*Nees*) *Mez* in Jahrb. Bot. Gart. Berl. v. 294 (1889).—*Oreodaphne glomerata* Nees in Linnaea, xxi. 515. *Nectandra mollis* Griseb. Fl. B.W.I. 282, *fide* Mez.

Tree. Branchlets rusty-pilose: leaves usually 10–20 cm. long, 3–6 cm. broad, broadly oblong- or elliptic-lanceolate, coriaceous; upper surface glabrescent with nerves rusty-tomentose; under surface more or less rusty-pubescent, usually glaucous; primary nerves distinct; about 2 cm. apart on full-size leaves, strongly prominent beneath, reticulation areolate; apex acuminate or acute, very rarely obtuse and cuspidate; base cuneate; petiole up to 1·4 cm. long: panicles up to about 20 cm. long, usually longer than the subtending leaves, rusty tomentose, the cymes contracted almost into heads: flowers creamy yellow, hermaphrodite (or polygamo-dioecious?), subsessile; calyx about 3 mm. diam., lobes broadly

ovate, obtuse, tomentose; staminodes 0: fruit a berry, oblong-ovoid, mucronate; cupule about 8 mm. diam., subsessile, shortly subturbinate, covering almost half the berry (mature fruit not seen?).

TRINIDAD: *Crueger* 123 ! in Kew Herb.; St. Anns, 626 *T.H.* !; Irois, *Crueger*, 1754 *T.H.* !; St. Joseph, 1756 *T.H.* !; Maracas, 1757 *T.H.* !; Moruga, 1758 *T.H.* !; woods on Cupar Grange, 2733 *T.H.* !; without locality, 6871 *T.H.* !; St. Patrick, *Cotton*, 11586 *T.H.* !; Southern Watershed Reserve, *Dardaine*, 11587 *T.H.*!; Morne L'Enfer Reserve, *Williams*, 12029 *T.H.* !; Siparia Reserve, *Williams*, 12199 *T.H.* !; without locality, *Rogers*, 12209 *T.H.* !; Siparia, *Broadway*, 12211 *T.H.* !; Southern Watershed Reserve, *Swabey*, 12231 *T.H.* !; Southern Watershed Reserve, *Russell*, 12412 *T.H.* !; Siparia, *Britton* 2823, in Herb. New York Botanical Garden.

Local names: *Laurier zaboca, Laurier cyp.*

7. **Ocotea oblonga** (*Meissn.*) *Mez* in Jahrb. Bot. Gart. Berl. v. 367 (1889).—*Mespilodaphne oblonga* Meissn., in DC. Prodr. xv. pt. 1, 107. *Ocotea Hartiana* Mez in Urban Symb. Antill. ii. 251.

Tree. Branchlets rusty tomentose: leaves 6–14 cm. long, 2·5–5 cm. broad, elliptic or broadly elliptic-oblanceolate; upper surface shining, the midrib tomentellous towards the base; lower surface rather rusty-pubescent with midrib tomentose towards the base; midrib and nerves prominulous above with chief veins markedly parallel and reticulation lax; midrib and nerves prominent beneath with reticulation more or less prominent; apex subacute or shortly and bluntly acuminate, base rather long cuneate; petiole up to about 1 cm. long: panicles up to about 11 cm. long, rusty-tomentellous: pedicels shorter than or subequal to the flowers: mature flowers not seen by me; calyx lobes ovate in bud: "berry ellipsoid 14 mm. long, 8 mm. diam.; cupule turbinate, rugose when dry, the pedicel much thickened and hardened."

TRINIDAD: *Crueger* 120, *fide* Mez.; Maraval, *Baptiste*, 5882 *T.H.* !; Santa Cruz, *Dannouse*, 6631 *T.H.* !; Arima, *Dannouse* !; Arena Reserve, *Brooks*, 12148 *T.H.* !; Southern Watershed Reserve, *Russell*, 12411 *T.H.* !; Tamana, *Marshall and Swabey*, 12400 *T.H.* !; Northern Range Reserve, *Brooks*, 12488 *T.H.* !, and 12600 *T.H.* !; Blanchisseuse Road, in forest near 10½ mile post, *Broadway*, 5528 !

FRENCH GUIANA: *Sagot* 491 ! in Kew Herb.

BRITISH GUIANA: *Sandwith* 264, in Kew Herb.

Local name: *Fine-leaf laurier.*

Ocotea Hartiana, Mez is based on Trin. Herb. 5882 (in Herb. Krug and Urban) from "Trinidad ad Maraval." "Species pulcherrima, ex habitu praesertim *Ocoteae insulari* proxime accedens, characteribus floralibus tamen longius remota, fortasse si pluries colligetur ad Oreodaphnis subgenus removenda." There is a note by Mez dated 1904 on the type sheet that *Ocotea Hartiana* Mez "is without doubt the same as *O. oblonga* (Meissn.) Mez."

5. Nectandra *Roland* in Rottb. Act. Lit. Univ. Hafn. i. 279 (1778).

Trees. Leaves alternate, coriaceous, penninerved; primary nerves often decurrent along the midrib. *Panicles* axillary or terminal, the cymes usually lax; flowers 2-sexual, polygamous. *Perianth-tube* short; segments 6, sub-equal. *Perfect stamens* 9; 1st and 2nd series glandular, much shorter than the perianth, with wide subsessile extrorse 4-locular anthers, the locules arranged in a bow below the margin; 3rd series narrowed at the base, with 2 sub-sessile glands; anthers extrorse 4-locular; staminodes of 4th series small, club-shaped. *Ovary* small, in the perinath-tube or exserted; style short. *Fruit* a berry, globose, ovoid or oblong, seated on, or enclosed at the base by, the enlarged, indurated, truncate, cupulate or expanded perianth-tube (when young sometimes included in the sub-globose tube?); perianth-segments deciduous in fruit.

Key to Species.

a. Branchlets (at least when young) densely and conspicuously short rusty-tomentose; inflorescence very lax, longer than the subtending leaves; primary nerves conspicuously impressed above.....1. *surinamensis*.

a. Not as above, *b*.

b. Primary nerves markedly decurrent along the midrib above, so that the latter is unusually (up to 2 mm.) broad: fls. large (up to 6 mm. diam.); the calyx with scattered short hairs or subglabrous .....2. *rectinervia*.

b. Primary nerves not markedly decurrent; fls. small; calyx grey tomentellous, *c*.

c. Secondary nerves not markedly transverse or parallel; reticulation prominent beneath; nerve axils beneath barbellate or not.....3. *martinicensis*.

c. Secondary nerves at right angles to midrib and parallel; reticulation not distinct beneath; nerve axils beneath not barbellate .....4. *membranacea*.

1. **Nectandra surinamensis** *Mez* in Jahrb. Bot. Gart. Berl. v. 454 (1889).

Tree. Branchlets rusty-tomentose: leaves up to 29 cm. long, 4–11 cm. broad, obovate to oblanceolate, coriaceous; upper surface with midrib and nerves tomentellous at the base; lower surface sometimes glaucous, with nerves and veins rusty-tomentose; nerves and veins deeply impressed above, prominent beneath with strong reticulation, the primary nerves scarcely decurrent along the midrib; apex bluntly acuminate; base rather long cuneate; petiole up to 1·75 cm. long: panicles up to 20 cm. long, more or less rusty tomentellous: pedicels longer than the flowers, slender spreading: flowers hermaphrodite; calyx 3 mm. diam., lobes ovate, obtuse, pubescent; staminodes club shaped: fruit a globose berry about 1 cm. diam. seated on a cupule which is about 7 mm. diam., saucer-shaped and very shallow, the pedicel enlarged and hardened.

Trinidad: without locality, 630 *T.H.*!; Maracas, 1755 *T.H.*! and 1763 *T.H.*!; "Hort. Trin.", *Broadway*, 3740!, 5504!, 5510!, and 10078 *T.H.*!; without locality, *C. S. Rogers*, *T.H.*!; Southern Watershed Reserve, *Russell*, 12119 *T.H.*!; Tamana, *Swabey and Marshall*, 12400 *T.H.*!; Arena, *Brooks*, 12549 *T.H.*!.

British Guiana: Cabalebo River, *im Thurn* s.n.! (type in Kew Herb.).

Local names: *Laurier mattack*, *Laurier zaboca*.

Also in French and Dutch Guiana.

2. **Nectandra rectinervia** *Meissn.* in DC. Prod. xv. pt 1, 158 (1864).—*Nectandra turbacensis* var. γ. *mexicana* Meissn. l.c. 152, and in Mart. Fl. Bras. v. pt. 2, 259.

Tree. Branchlets at apices appressed pubescent (early glabrescent): leaves 5–15 cm. long, 2–5 cm. broad, elliptic or oblong-lanceolate or oblanceolate, rigidly coriaceous, appressed pubescent, glabrescent on both surfaces; nerves prominulous above, lower surface with nerves and reticulation prominent; primary nerves markedly decurrent along the midrib, often to the nerve below; apex more or less bluntly acuminate, base cuneate; petiole up to 1·25 cm. long: panicles up to about 10 cm. long, shorter than or subequal to the leaves, puberulous: pedicels rather longer than the flowers: flowers hermaphrodite; calyx 6 mm. diam., lobes ovate-oblong obtuse; staminodes triangular: fruit a berry "ellipsoid, 12 mm. long, 6 mm. diam."; cupule about 1 cm. diam., cup-shaped, warty, "covering up to $\frac{1}{3}$ of the berry"; pedicel enlarged and hardened in fruit.

Trinidad: Arouca, *Crueger* 281! in Kew Herb.; without locality, 627 *T.H.*!; Laventille, 1768 *T.H.*!; Arouca, 1753 *T.H.*!; Bridge of Cipero, 2734 *T.H.*! and 3039 *T.H.*!; Arima, *Dannouse*, *T.H.*!; St. Ann's, *Broadway*, 12210 *T.H.*!; St. Ann's, *Marshall*, 12259 *T.H.*!.

Venezuela, *Funck* 151 (co-type! in Kew Herb.).

Also recorded by Mez from Mexico, Nicaragua and Venezuela.

3. **Nectandra martinicensis** (*Jacq.*) *Mez* in Jahrb. Bot. Gart. Berl. v. 439 (1889).—*Laurus martinicensis* Jacq. Coll. ii. 109, t. 5, fig. 2.

Small tree. Youngest branchlets sericeous, older appressed pubescent: terminal buds silky white tomentose: leaves 10–20 cm. long, 4–6·5 cm. broad, elliptic or oblong-elliptic, thinly coriaceous, both surfaces with more or less sparse appressed hairs; on upper surface midrib often prominent towards apex and deeply impressed towards base with nerves and reticulation prominent; on under surface nerves and reticulation prominent; primary nerves often decurrent along the midrib; apex gradually and broadly acuminate, base cuneate; petiole up to 1 cm. long, channelled: panicles up to about 10 cm. long, rather long pedunculate, grey tomentose to glabrescent, with cymes rather aggregated on lateral branchlets: pedicels longer than the flowers, like the buds densely tomentellous:

flowers hermaphrodite ; calyx 5–6 mm. diam. when open, lobes ovate or oblong, obovate, obtuse ; filaments hairy ; staminodes club shaped : fruit a berry, ellipsoid about 11 mm. long, 8 mm. diam. seated on a cupule about 5 mm. diam., turbinate, mouth saucer-shaped, the pedicel enlarged and hardened.

Trinidad : *Sieber*, " Fl. Trinitatis," 99 ! in Kew Herb. ; without locality, 6886 *T.H.* ! ; Southern Watershed Reserve, *Marshall*, 11642 *T.H.* ! ; Quinam Road, *Cotton*, 11643 *T.H.* ! ; Tabaquite, *Dannouse*, 12213 *T.H.* ! ; Southern Watershed Reserve, *Swabey*, 12391 *T.H.* ! ; 10½ mile Penal Rock Road, *Williams*, 12173 *T.H.* ! ; North Road, *Marshall*, 12392 *T.H.* ! ; Southern Watershed Reserve, *Marshall*, 12406 *T.H.* ! ; Plum Road, *Marshall*, 12428 *T.H.* !.

Also recorded by Mez from Panama.

Tobago, *fide* Britton under *N. antillana* Meissn., specimens not quoted, possibly belong here, but specimens not seen by us.

Local name : *Laurier cypre.*

4. **Nectandra membranacea** (*Sw.*) *Griseb.* Fl. B.W.I. 282 (1864) ; Meissn. in DC. Prod xv. pt. 1, 161 (1864).—*Laurus membranacea* Swartz. Prod. 65, and Fl. Ind. Occ. ii. 713. Mez cites the following, among others, as synonyms of this species : *Oreodaphne strumosa* Gris. l.c. 284 (in adnot. ad *O. parvifloram*). *Nectandra cuspidata* var. δ. *strumosa* Meissn. in DC. Prod. l.c. 159. *Nectandra leucantha* β. *Rodiaei* Griseb. l.c. 282.

Tree. Branchlets puberulous : leaves mostly 10–20 cm. long, 3–6·5 cm. broad, narrowly elliptic or oblong-ovate, thinly coriaceous ; upper surface glabrous except on the puberulous to glabrescent nerves ; under surface puberulous, the nerves tomentellous ; primary nerves on upper surface more or less flat, prominent beneath, usually decurrent down the midrib, principal veins parallel, delicate, indistinct ; apex rather acutely subcaudate-acuminate ; base cuneate ; petiole up to 1·5 cm. long : panicles up to about 13 cm. long, usually shorter than the subtending leaves, puberulous : pedicels longer than the flowers : flowers hermaphrodite ? ; calyx 4 mm. diam., lobes oblong-ovate, rounded, the edges reflexed when open ; staminodes club-shaped : mature berry not seen ; cupule 6–7 mm. diam., turbinate, mouth saucer-shaped ; pedicel enlarged ; fruiting cupule and pedicel warty.

Trinidad : without locality, *Crueger* 91 (*fide* Mez) ; Hts. of Aripo, *Broadway*, 9873 *T.H.* !.

Maraval, *Baptiste*, 5849 *T.H.* ! almost certainly belongs here, but the material is insufficient.

Tobago : *Williams*, 11805 *T.H.* !.

Martinique : *Hahn* 975 ! in Kew Herb.

Also recorded by Mez from Jamaica, Porto Rico, St. Thomas and Dominica.

6. Persea *Mill.* Gard. Dict. Abr. ed. 4 (1764).

Trees. *Leaves* alternate or sub-opposite, persistent, coriaceous, penninerved. *Panicles* axillary or subterminal. *Flowers* small, hermaphrodite, or by abortion polygamous, bracteate. *Perianth-tube* short ; segments 6, subequal (or the 3 outer smaller). *Perfect stamens* 9, the filaments of 1st and 2nd series eglandular, with introrse 4-locular anthers ; of the 3rd series 2-glandular at the base, the glands subsessile, anthers extrorsely 4-locular ; staminodes of 4th series cordate or sagittate, stipitate. *Ovary* sessile ; stigma discoid. *Fruit* a berry ; fruiting perianth deciduous (or persistent) ; pedicel thin or more or less thickened.

***Persea americana** *Mill.* Gard. Dict. ed. 8 (1768).—*Persea gratissima* Gaertn. f. Fruct. & Sem. iii. 332 (1807). *Persea Persea* (L.) Cockerell in Bull. Torr. Club xix. 95 (1892). *Laurus Persea* L. Sp. Pl. ed. 1, 370.

Tree. Branchlets tomentellous : leaf-blades " 7–25 cm. long, 3–16 cm. broad " varying from oblong to elliptic or oval, broadly ovate or even suborbicular ; puberulous, at least on the midrib above, glabrescent ? on the midrib and nerves below ; primary nerves more or less flat on the upper surface, prominent beneath, both surfaces of fully developed leaves finely reticulate ; apex obtuse or broadly cuspidate ; base rounded or cuneate : flowers in broad compact panicles at the ends of the young branchlets, shortly pedicellate, bracteate : calyx about 5 mm. diam., lobes oblong-oblanceolate ; stamens with the lower locules of the anthers touching the upper at the side : berry " in cultivated species from 10 even to 20 cm. long," pear shaped ; pericarp thick, edible : fruiting perianth segments deciduous.

TRINIDAD : *Sieber*, " Fl. Trinitatis," 69 ! in Kew Herb. ; *Broadway* 5201 ! ; Hort. Trin. *Broadway* 5491 ! ; without locality, 2652 *T.H.* !

Local names : *Avocado Pear, Alligator Pear, Zaboca.*

Also recorded by Mez from Mexico, Central America, Guatemala, Nicaragua, Bahamas, Cuba, Jamaica, St. Domingo, Porto Rico, St. Thomas, St. Croix, Antigua, Montserrat, Guadeloupe, Dominica, Martinique, St. Vincent, Guiana, Venezuela, Colombia, Peru, Bolivia, Brazil, Madeira, Madagascar, Mauritius, Rodriguez, Seychelles and Java.

7. Phoebe *Nees*, Syst. Laur. 98 (1836).

Trees or *shrubs*. *Leaves* alternate, coriaceous or chartaceous, penni- or subtriplinerved. *Panicles* axillary or subterminal. *Flowers* hermaphrodite. *Perianth-tube* short ; segments 6, subequal, or the outer more rarely a little smaller than the inner. *Perfect stamens* 9, the filaments of the 1st and 2nd series eglandular with introrse 4-locular anthers, those of the 3rd series 2-glandular at the base, anthers extrorsely 4-locular ; staminodes of the 4th series cordate-sagittate. *Ovary* sessile ; stigma discoid. *Fruit*

a berry, fruiting perianth scarcely enlarged, persistent below the fruit.

Phoebe elongata (*Vahl*) *Nees*, Syst. Laur. 116 (1836).—*Laurus elongata* Vahl ex Nees, l.c. *Phoebe cubensis* Nees, l.c. 120, *fide* Britton in Scientific Survey Porto Rico and the Virgin Islands, v. pt. 3, 319.

Tree, "6–12 m. tall, occasionally up to 20 m." (Britton): branchlets pubescent or glabrous, buds more or less tomentose; leaves about 5–17 cm. long, 2–7 cm. broad, lanceolate or elliptic lanceolate to broadly ovate elliptic, penni- or generally subtriplinerved, glabrescent above, generally pubescent or very sparingly pilose on midrib beneath with lower nerve axils barbellate, lamina beneath furfuraceous or glabrous; midrib and nerves on upper surface flat and reticulation indistinct; midrib and nerves prominent beneath, reticulation usually distinct and subprominent beneath; apex acuminate, base gradually or abruptly cuneate to almost rounded; petiole up to 12 mm. long: inflorescence up to about 30 cm. long, peduncles tomentose to glabrous: calyx up to about 6 mm. diam., puberulous, lobes ovate; stamens with the lower locules of the anthers touching the upper at the base; staminodes sagittate; ovary glabrous: berry ellipsoid, about 13 mm. long and 7 mm. diam.

Var. **elliptica** *R. L. Brooks*, var. nov.; a typo foliis elliptico-lanceolatis vel ellipticis usque ovatis differt.

Trinidad: *Crueger* 282!; Woods at Valencia, *Eggers* 1414 in Kew Herb.!; Woods at Arima, *Eggers* 1471 in Kew Herb.!; St. Anns Reservoir, *Hart*, 5117 *T.H.*!; Diego Martin, *Broadway* 5375!; Arima, *Dannouse*!; Road to Maracas Waterfall, 2731 *T.H.*!; Siparia, *McLean*! s.n.; without locality, 1451 *T.H.*!, 1769 *T.H.*!, 6617 *T.H.*! and 12214 *T.H.*!

Cuba: *Wright* 2583, 2591! in Kew Herb.

Var. **lanceolata** *R. L. Brooks*, var. nov.; a typo foliis lanceolatis differt.

Trinidad: Valencia, *Rosales*, 12153 *T.H.*!; Tacarigua, 12155 *T.H.*!; Paria-Morne Bleu Road, *Brooks*, 12480 *T.H.*!.

Also recorded by Mez from Porto Rico, Montserrat, St. Croix, Martinique, Guadeloupe, St. Domingo and St. Vincent.

The two types described here appear at first sight to represent two totally distinct species, but from the material available I am unable to find any characters which do not intergrade. In several specimens the flowers are badly galled; in others the apparent difference in size may be due to difference in age.

Local names: *Laurier Cypre, Laurier mama z'enfant.*

8. Cassytha *L.* Sp. Pl. 35 (1753).

Climbing perennial *herb*. *Stems* twining, filiform, adhering by means of suckers. *Leaves* represented by minute scales. *Flowers* spicate, subsessile in axil of a scale-like bract with 2 minute

bracteoles. *Perianth-tube* at length baccate ; segments 6, the 3 outer much smaller than the inner. *Perfect stamens* 9, those of the 1st and 2nd series eglandular with introrse 2-celled anthers, those of 3rd series with 2 subsessile glands, anthers extrorsely 2-celled, staminodes of 4th series conspicuous. *Ovary* scarcely immersed in perianth tube during flowering, later altogether enclosed by the enlarged perianth-tube which becomes constricted at the apex. *Fruit* enclosed by the succulent perianth-tube, perianth segments persistent.

Cassytha filiformis *L.* Sp. Pl. 35 (1753).—*Cassytha americana* Nees. Syst. 664 (1836).

Stem up to 2 mm. thick, glabrous, yellowish : flowers about 2 mm. long, " white " : fruit 5–6 mm. diam., berry globose, enclosed by the succulent perianth-tube, which is crowned by the persistent segments.

Trinidad : Aripo Savannah, *Crueger* ! ; without locality, *Crueger* or *Finlay*, 2735 *T.H.* ! ; *Freeman* 7938 *T.H.* ! and 9080 *T.H.* !; *Broadway* 5322 ! ; *Freeman* and *Farmer* ! ; Tabaquite, *Dannouse* ! ; Erin, *Broadway* 7338 ! ; Guayaguayare, *Mota*, 11974 *T.H.* !.

Undetermined Trinidad Specimens.

1. **Ocotea sp. ?** Small tree : branchlets appressed, more or less rusty tomentellous, glabrescent : leaves 6·9 cm. long, 2–4·5 cm. broad, elliptical, upper surface glabrous and glaucous, beneath finely puberulous especially on nerves and veins, glabrescent, the lower nerve axils often barbellate and foveolate ; midrib, nerves and reticulation sub-prominent above, prominent beneath ; midrib often warty at the base above ; apex shortly acuminate, base cuneate and decurrent on the warty petiole : panicles up to about 9 cm. long, axillary or sub-terminal, appressed puberulous : flowers dioecious ? white, fragrant ; calyx about 3 mm. diam., sparsely puberulous or glabrous ; anthers with locules superimposed in pairs : fruit not seen.

Trinidad : Eastern Main Road, east of Valencia, March 13th. 1925, *Broadway* 5573 ! in Kew Herb.. Cf. *O. Eggersiana* Mez.

2. **Phoebe sp. ?** Small tree : branchlets glabrescent, with hollow pith : leaves up to about 25 cm. long, up to 12 cm. broad, elliptical to ovate elliptical ; upper surface glabrous, at least when mature, lower surface appressed pubescent ; midrib impressed and nerves more or less flat above with reticulation finely areolate, midrib and the decurrent nerves strongly prominent beneath, reticulation obscured by the indumentum ; apex acuminate or caudate-acuminate, base cuneate ; petiole up to 5 cm. long, channelled : flowers not seen : fruit a berry about 2 cm. long, 2 cm. wide, seated on the persistent ? unequal perianth segments ; pedicel enlarged and hardened ; seed with two large fleshy cotyledons.

Trinidad: Junction of Blanchisseuse and Las Lopas Roads, February 26th, 1926, *Broadway* 5981 in Kew Herb. !. This may, possibly, belong to another family.

Species Excluded and Synonyms.

1. *Aydendron citrifolium* Griseb. l.c. 284, not of Nees. Recorded from "St. Ann's" (*Crueger* 59 !) by Grisebach = *Aniba trinitatis* (Meissn.) Mez.

2. *Nectandra antillana* Meissn. Meissner recognised that Grisebach's *N. leucantha* was not the species so named by Nees, and described it as *N. antillana*. In this he has been followed by Fawcett and Rendle, and by Britton. Britton records *N. antillana* from Tobago, but does not cite a specimen, and we have seen no material.

3. *Nectandra dominicana* (Meissn.) Mez.—*Oreodaphne dominicana* Meissn. in DC. Prodr. xv. pt. 1, 139. Recorded from Trinidad by Mez on the strength of *Sieber* 229, but, as pointed out by Sandwith, "many of Sieber's specimens, labelled Trinidad, are almost certainly from Guadeloupe, and this is probably one of them."

4. *Nectandra leucantha* Griseb. l.c. 282, not of Nees=*N. antillana* Meissn.

Nectandra leucantha b. *Rodiaei* Griseb. l.c. 282, not of Schomb.= *N. membranacea* Griseb. *fide* Mez. *N. leucantha* Nees occurs in British Guiana ! and Brazil !, but does not appear to extend to Trinidad.

5. *Nectandra mollis* Griseb. l.c. 282, not of Nees, as regards the Trinidad record=*Ocotea glomerata* (Sw.) Mez.

6. *Nectandra sanguinea* Griseb. l.c. 281, not of Rottb., as regards the Trinidad record *Sieber* 99=*N. martinicensis* Mez.

7. "*Nectandra strumosa* Mez" appears to be a nomen nudum; *Oreodaphne strumosa* Griseb. l.c. 284 (in adnot. ad *O. parvifloram*), is referred by Mez to *Nectandra membranacea* (Sw.) Griseb.

8. *Ocotea floribunda* (Sw.) Mez, is recorded by Britton (Scientific Survey of Porto Rico and the Virgin Isls. v. pt. 3, 321) from "Trinidad"; no specimen is cited, and the New York Botanical Garden specimens have not been seen. Dr. Britton has collected in Trinidad and it is possible that he refers to the tree here called *O. arenaensis* R. L. Brooks, sp. nov.

9. *Endlicheria sericea* Nees.—*Aydendron sericeum* (Nees) Griseb. l.c. 284. Recorded from Trinidad on the strength of *Sieber* 175. This again is probably from Guadeloupe.

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XXIX—SOME NOTES ON THE TROODOS PINE OF CYPRUS.*

A. Foggie (Forest Department, Cyprus).

The Troodos pine has been known generally by the name of *Pinus laricio* Poir., var. *Pallasiana* Endl. Comparison of specimens from Cyprus with the description of this variety in Dallimore and Jackson's "Coniferae" shows discrepancies in various points as indicated below. This caused the present writer to doubt whether the Troodos pine did belong to this variety, and, on making a short investigation, it was found that the identification was correct but that the nomenclature was exceptionally confused. The correct name of this pine, under the International Rules of botanical nomenclature, as found by Drs. Sprague and Turrill of Kew, is *Pinus nigra* Arnold var. *caramanica* (Loud.) Rehd.

The Troodos pine occupies a well defined locality in Cyprus, being confined to the slopes of Mt. Troodos or "Chionistra." Isolated specimens are found between 3000 and 3500 ft. altitude. Above this it occurs in a mixed stand with *Pinus halepensis* Mill. and *Quercus alnifolia* Poech between 3500 and 4000 ft., becoming dominant above this altitude and extending up to the tree limit, 5700 to 5850 ft. In the upper half of its area *Juniperus foetidissima* Willd. is commonly associated with it as a secondary species. The soil on which it grows is generally shallow and is a residual skeletal soil derived from the underlying intrusive igneous rocks, mainly diabase and gabbros, the latter giving a deeper, stiffer soil on the gentler slopes.

The Troodos pines when young have straight stems with thin, narrow-conical to elliptic crowns formed by numerous whorls of

*This paper is the result of studies carried out during a Refresher Course at the Imperial Forestry Institute, Oxford, under the direction of Dr. J. Burtt Davy. The writer's thanks are due to the Director of the Royal Botanic Gardens, Kew, and to the Keeper of Botany, British Museum, S. Kensington, for permission to study the material there, and to Drs. Sprague and Turrill of Kew for help on several points.

short, horizontal branches of medium thickness. The mature needles are dark green. When old the tree generally has a flat-topped crown with heavy upper branches which may be thicker and larger than the lower ones. It is interesting to note that in these details of habit, both in youth and age, the Troodos pine seems to agree with the Corsican pine, *Pinus nigra* Arnold (syn. *P. laricio* Poir.), in its native habitat as described by Elwes and Henry (12). Referring to the Forest of Valdoniello in Corsica, of which they show two photographs on Plate 114, they state :—

> " Plate 114, from a negative kindly lent us by M. A. André, Inspector of the French Forest Service, shows very well the peculiar habit assumed by the Laricio in old age, the crown becoming remarkably flattened, owing to the bending over of the leading shoot and the increase in size in the upper branches, which become very stout and horizontal or even curve slightly downwards."

To deal briefly with the synonymy, the species was first named and described by Arnold in 1785 (1) as *Pinus nigra*. It was, later, (1804), renamed *Pinus laricio* by Poiret, by which name it has been commonly known.

This species includes the Corsican, Austrian, and Caramanian pines, the Troodos pine belonging to the last mentioned.

The Caramanian pine was first collected by Professor Pallas in the Crimea, and was named and figured by Lambert as *Pinus Pallasiana* (2). Later, in 1838, Loudon reduced it to the rank of a variety of *Pinus laricio* as *P. laricio* 3 *caramanica* (5). Antoine in 1840 (6) restored the old specific epithet for the variety as *P. laricio* var. *Pallasiana* ; this course was also followed by Endlicher in 1847 (7). Dallimore and Jackson (15) quote Endlicher as author of this combination. Ascherson and Graebner, though returning to the specific name *Pinus nigra* Arnold, still use the epithet *Pallasiana* for the variety (10). Rehder in 1927 (14) published the correct name under the International Rules of botanical nomenclature namely, *Pinus nigra* Arnold var. *caramanica* (Loud.) Rehd.

It was necessary to determine whether the Troodos pine could properly be included in Loudon's variety. In this question the extant literature does not give much assistance. The Troodos pine is assigned in the latest, and still most accurate, work on Cyprus, Holmboe's Studies on the vegetation of Cyprus (13), to *Pinus nigra* Arnold sub-species *Pallasiana* (Lamb.). Elwes and Henry (12) dismissed Lambert's *Pinus Pallasiana* as indeterminate, while in Dallimore and Jackson (15) the description, which is very brief, did not tally with the available material. Other works on the Cyprus flora did not help. Kotschy, for example (8), quoted three different varietal names indiscriminately throughout, and Post (11) did not distinguish it as a variety. The question, therefore, had to stand over until an opportunity was found to visit Kew. The material from the Imperial Forestry Institute, and other good material of the

Troodos pine from the collections of Sintenis and Rigo and of Post which was found there, was compared with Lambert's original description and plate. This material was also checked against other specimens of the same variety coming from Asia Minor. The type specimen collected by Pallas and kept in Lambert's Herbarium is now in the European Collection in the British Museum, South Kensington, under the original name of *Pinus Pallasiana* Lamb. The specimens from the Imperial Forestry Institute of the Troodos Pine (Nos. 20,500, 27,345, and 27,346) were compared with the type specimen and were found to be a good match.

Ascherson and Graebner (10) followed Elwes and Henry in dismissing Lambert's description of *P. Pallasiana* as indeterminate. They quoted Link and Koch as the authorities for the view that Lambert's *P. Pallasiana* might belong to *P. Pinaster*. Koch (9), however, quotes it under *P. maritima* Mill., and merely mentions that it might perhaps be better placed under *P. Pinaster* Sol. ex Ait. But Lambert (32) also gives a good description with two plates of *P. Pinaster* Sol. ex Ait. ; he also describes a *P. maritima* Michel et Phytopin (4).* The indeterminate description is not that of *P. Pallasiana* and is more likely to be that of *P. maritima* Michel et Phytopin.

Though the type specimen is filed in South Kensington with *P. nigra* Arnold (syn. *P. laricio* Poir.), the specific name *P. Pallasiana* Lamb. is still retained there. This course is also followed by A. de Degen and G. Bujorean, who collected in Caras-Severin (Roumania) and whose material is also at South Kensington. The differences between the Caramanian pine and typical *P. nigra* Arnold do not appear to be sufficient to warrant restoration to the rank of species. In general appearance, in bud characters, and in general cone characters, var. *caramanica* definitely belongs to the species *P. nigra* Arnold.

Var. *caramanica* is separated from the species largely on leaf characters and some details of the cone. The leaf characters are as follows : Leaves straight or only occasionally or slightly twisted at the base, broad, but not rigid, in the sense that they bend slightly when lightly tapped on the apex ; hypoderm thickened at the angles and locally thickened to 2–4 cells thick. The variety therefore lies between the type and var. *austriaca* (*P. laricio* var. *nigricans*) in this character. Resin canals few (8 or 9), distinct, with firm surrounding cells ; stomatic lines 9–12 on each surface. This description differs considerably from that given by Dallimore and Jackson (15) for var. *Pallasiana* Endl.

It is generally stated that the principal differences in the cone are that the ridge or keel of the apophysis of the cone scale is blunt, that the tubercle is furnished with a spine, and that the cone is often twice the size of that in the typical form. Both Antoine and Endlicher state also that the upper surface of the cone scale bearing the seed is not sphacelate.

*Koch (12) treats *P. Pinaster* Sol. ex Ait (1789) as distinct from *P. Pinaster* Mor. (1827), which he places under *P. maritima* Mill. (1795).

Dallimore and Jackson state that the variety grown in Britain and known as *Pallasiana* is a stout, branched, fastigiate tree. Rehder makes the same observation with regard to var. *caramanica* which he unites with var. *Pallasiana*. This, however, is not the common form in Cyprus, but the writer has been informed by Mr. R. R. Waterer, Assistant Conservator of Forests, Cyprus, that he has occasionally come across fastigiate trees in the Troodos Forest.

Dallimore and Jackson class this variety with *P. nigra* var. *austriaca* (*P. laricio* var. *nigricans* Parl.), the Austrian Pine, as occurring naturally on limy soils, and material from G. Bujorean from Roumania is noted to have come from a calcareous soil. I believe that it grows on limestone also in the Crimea and Anatolia. At the altitude at which it occurs in Cyprus, however, there are only igneous rocks.

The distribution of var. *caramanica* appears to be as follows: the Crimea, the western end of the Transylvanian Alps, Asia Minor, and Cyprus. Post's Flora does not record it for Palestine. The record made by Degen and G. Bujorean of this variety from Mt. Domugled near Herkules in the district of Caras-Severin (Krassó-Szürény) in Roumania is interesting. It may be an outlying colony which has established itself after migration up the Danube or it may be that this variety exists more widely in the Balkan Peninsula than is at present known. *Pinus nigra* var. *caramanica* may be taken to be the most easterly geographical variety of the species, and in character to stand between the type and var. *austriaca*.

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XXX—ON THE FLORA OF THE NEARER EAST: XIV.*

THE ELMS OF WESTERN THRACE. H. GRIFFITH TEDD AND W. B. TURRILL.

The taxonomy of the genus *Ulmus* is in a very confused condition. Even for British and Central European elms, presumably growing in areas from which abundant material is available, it is difficult to reconcile the many varieties of taxonomic opinion and the diverse nomenclature employed by different authors. It is fairly generally admitted that hybridization accounts for some of the numerous variations, and since many elms clone readily hydrids may be widely distributed even in the absence of regular seed fertility.

There has been little detailed study of the elms of the Balkan Peninsula, chiefly owing to the lack of adequate material. The woody vegetation of this area is botanically the richest in Europe, and no clear idea of the taxonomy and history of *Ulmus* in Europe can be obtained till more is known of the genus in south-eastern Europe and Asia Minor. One of us (H. G. Tedd), resident in western Thrace, has made a collection of 95 sheets, from 24 trees on the Aegean coastlands to the foot of the Rodopes. The majority of the trees are represented by specimens of flowers, fruits, and leaves, collected at different times of the year. While the collection does not pretend to be exhaustive it is representative of the elm population of the district and serves as a basis for the following preliminary study.

It has proved difficult to apply names in the exact sense of original, or other, authors, even when published descriptions are sufficiently detailed to enable a proper comparison to be made. It is very probable that in *Ulmus* we have one of the many genera where the common system of taxonomic nomenclature is impracticable for detailed research. The difficulties of applying herbarium methods are enhanced in tree genera because of the frequent inadequacy of material, and the suggestion is merely made here that a scheme of symbolic description may be found more convenient than the application of names to innumerable "varieties." Such a scheme has been applied with success to the herbaceous species *Silene maritima*, *S. vulgaris*, and *Glaucium flavum*†. Since material is not yet available for such a revision as the adoption of a similar scheme in *Ulmus* would involve, we content ourselves with brief descriptions of the Thracian elms and an indication of their probable relationship to described species.

Most of the specimens can best be included within the species *Ulmus nitens*. The original description of this species (Moench, Meth. 333: 1794) reads: "foliis utrinque glabris ovatis: supra nitentibus: duplicato-serratis obliquis. *Ulmus carpinifolia*. Ehrhart." The name *U. carpinifolia* Ehrhart has not been traced beyond this reference. Hayek, Prodr. Flor. Penins. Balc. i. 91

*Continued from *Kew Bull.*, 1932, 454.

†See *Kew Bull.* 1928-1933, *passim*.

(1924) adopts the name *U. foliacea* Gilib. Henry, in Elwes and Henry, Trees of Great Britain and Ireland vii. 1887, footnote (1913), points out that this name cannot be identified with certainty, though it was probably based on an elm conspecific with *U. nitens*. Stearn and Gilmour (Journ. Bot. lxx. Suppl. 22 : 1932) are similarly doubtful of the application of the name *U. foliacea* Gilib. Apart from its application the name appears to be illegitimate for nomenclatural reasons.

Descriptions of Specimens.

Tedd 797 : Bark coarse, much corky growth on younger branches. Current year's leafy twigs densely hairy becoming glabrous and greyish-brown later. Leaf buds ovoid, scales with more or fewer silky white adpressed hairs on the back and long white cilia. Flowering buds nearly spheroidal with long white silky pubescence usually in greater quantity than on the leaf-bud scales and with long white cilia. Leaves broadly elliptic or oblong-elliptic, apex narrowed to an acute acumen about 1 cm. long, base usually distinctly unequal, blade averaging 9 cm. long and 6·4 cm. broad, main teeth regular 3–4 mm. long, entire on shorter side, on longer side provided with 2–4 (usually 3–4) smaller teeth, about 10–14 veins on each side, upper surface with fine short pubescence all over but scarcely rough, lower surface of younger leaves with dense white soft pubescence, or older leaves with white soft pubescence all over but denser in vein axils and along the veins, also a few shortly stalked capitate glands ; petiole 1 cm. long. Perianth lobes 5, ciliate. Stamens 5. Samara obovate, apical notch 2 mm. deep, lined with hairs, base cuneate, 1·8 cm. long, 1·2 cm. broad, seed above middle and often only just below apical notch.

The plant is too hairy for true *U. nitens* Moench, and is, indeed the most hairy of the collection. Possibly it represents merely one extreme of variation within the species, more doubtfully it may be of hybrid origin.

Boyadjiler, 17.2.32 (flowers), fruits and leaves later, hedgerows of pasture and arable land. Suckers from the roots.

Tedd 798 : flowering material only. Perianth segments 5, ciliate. Stamens 5.

Boyadjiler, 17.2.32 (flowers), hedgerows of pasture and arable land.

Tedd 799 : Corky bark. Second year's twigs reddish. Leaves broadly ovate, asymmetrically cordate, with main teeth entire or with up to 3 smaller teeth on one side, average of 2 smaller teeth on one side of each main tooth, averaging 8 cm. long and 4·5 cm. broad (up to 6·2 cm. broad), 9–13 veins, upper surfaces practically glabrous, very slightly rough, under surface pubescent all over not quite so densely as in 797, few stalked glands ; petiole 1 cm. long. Perianth 5-lobed. Stamens 4. Samara broadly spherical-obovate, apical notch 3 mm. deep, 1·8 cm. long, 1·7 cm. broad, seed above middle.

Differs from 797 chiefly in narrower leaves, glabrous upper surface, less dense pubescence on under surface, broader samaras. Under *U. nitens* Moench.

Boyadjiler, 17.2.1932 (flowers), fruits and leaves later, hedgerows in pasture and arable land.

Tedd 800 : Corky bark on twigs. Second year's twigs reddish. Leaves mainly with 2 smaller teeth on one side of each main tooth, broadest at or above middle, averaging 8·5 cm. long and 5 cm. broad, 12–16 veins, veins very close together, upper surface as in 797, lower as in 799 ; petiole 1·1 cm. long. Perianth most often 6-lobed. Stamens 4. Samaras pale shiny, elliptic to obovate-elliptic, apical notch 3–5 mm. deep, 2·4 cm. (up to 2·6 cm.) long, 1·6 cm. broad, seed slightly in upper half of fruit. Under *U. nitens* Moench.

Boyadjiler, 17.2.1932 (flowers), fruits and leaves later.

Tedd 801 : Not corky. Second year's twigs reddish grey. Leaf and inflorescence buds very hairy. Leaf teeth mainly entire, some with one smaller tooth. Leaves elliptic or elliptic-oblong, averaging 7 cm. long and 3·5–4 cm. (up to 5 cm.) broad, upper surface with thinly scattered hairs all over, lower surface as 797, 11–15 veins ; petiole 1 cm. long. Perianth 5–6-lobed. Stamens 4. Samaras oblong-obovate, apical notch 2 mm. deep, 2 cm. long, 1·3 cm. broad, seed well above middle. Under *U. nitens* Moench.

Boyadjiler, 17.2.1932 (flowers), fruits and leaves later, hedgerows in pasture and arable land.

Tedd 802 : Bud scales more or less hairy with conspicuous white cilia. Only young leaves. Upper surface nearly glabrous. Lower surface with white axillary tufts of hairs, but otherwise nearly glabrous. Samaras broadly obovate-elliptic, apical notch 2·5 mm. deep, 1·8 cm. long, 1·4 cm. broad, seed above middle. Under *U. nitens* Moench.

Boyadjiler 17.2.1932 (flowers), fruits and young leaves later, hedgerows of pasture and arable land.

Tedd 803 : Lower branches pendulous. Not corky. Leaves asymmetrically elliptic to broadly elliptic, main teeth mostly with 1–2 smaller teeth on one side, averaging 6·5 cm. long and 3·5–4 cm. (up to 5·7 cm.) broad, upper surface with relatively few scattered hairs, not rough, lower surface as in 799 ; petiole 1·1 cm. long. Perianth 5-lobed. Stamens 4. Samaras nearly spherical, apical notch 3 mm. deep, 1·5 cm. long, 1·4 cm. broad, seed slightly in upper half. Under *U. nitens* Moench.

Karakeuy, 20.2.1932. (flowers), fruits and leaves later, arable field at roadside.

Tedd 804 : Not corky, white-grey bark, Leaves elliptic to obovate-elliptic, main teeth usually with 1–2 smaller teeth on one side, sometimes rather coarsely toothed, averaging 8·5 cm. long and 3·5–4 cm. broad, upper surface with few hairs and also slightly rough, under surface pubescent all over (less dense than 797) and with numerous shorter glands in addition ; petiole 1 cm. long. Perianth

5-lobed. Stamens 4–5. Samaras elliptic (with scarcely any trace of being obovate), apical notch 3 mm. deep, 1·7 cm. long, 1·3 cm. broad. Possibly a hybrid with *U. nitens* for one parent.

Karakeuy, 20.2.32 (flowers), fruits and leaves later, hedgerow. Suckers from the roots.

Tedd 805 : Marked corky growth. Leaves elliptic, rather long acuminate, main teeth mostly with 1–2 smaller teeth on one side, averaging 7·5 cm. long and 4 cm. broad, upper surface sparsely and finely hairy, not rough, under surface as 799 ; petiole 9 mm. long. Perianth 5–6-lobed. Stamens 4–5. Samaras very broadly elliptic, 1·6 cm. long. 1·5 cm. broad, seed just above middle. Under *U. nitens*.

Karakeuy, 20.3.1932 (flowers), fruits and leaves later, hedgerow. A young tree (15–20 years), suckers from the roots.

Tedd 806 : Not corky. Leaves asymmetrically elliptic, main teeth entire or with one smaller tooth on one side, very few short hairs on upper surface, but not rough, lower surface as 799 with short glandular hairs also ; petiole 7–10 mm. long. Perianth 5-lobed. Stamens 4. Samaras broadly obovate-elliptic, apical notch 2·5 mm. deep, 1·6 cm. long, 1·2–1·4 cm. broad, seed in upper half, almost to base of notch. Under *U. nitens* Moench.

Karakeuy, 20·2.1932 (flowers), fruits and leaves later ; a group of 3 old trees solitary in field. No suckers seen.

Tedd 807 : Not corky (?). Leaves broadly asymmetrically elliptic, main teeth rather broad and shallow, entire or with 1–2 smaller teeth on one side, 11–13 veins, upper surface with few scattered hairs and not rough, lower surface with axillary tufts of conspicuous white hairs and rather less soft pubescence between the main secondary veins than in 799 ; petiole 8 mm. long. Perianth 4–5-lobed. Stamens 4–5. Samaras obovate to nearly orbicular, notch with stigmata rather low down and wing curvature above stigmata pronounced, 3·5 mm. deep, 1·7–2 cm. long, 1·5 cm. broad, purplish above seed especially on one side, seed usually above middle. Under *U. nitens* Moench.

Sakarka, 2.2.1932 (flowers), fruits and leaves later, hedgerow. Probably no suckers.

Tedd 808 : Not corky. Leaves broadly asymmetrically elliptic, teeth mainly simple, 11–13 veins, upper surface practically glabrous not rough, lower surface with conspicuous white axillary tufts of hairs but with few scattered soft hairs between secondary veins and fairly numerous glands, petiole 1 cm. long. Perianth 5-lobed. Stamens 4. Samaras obovate, apical notch 3 mm. deep, 1·9 mm. long, 1·5 cm. broad, seed in upper half up to base of notch. Under *U. nitens* Moench.

Sakarka, 21.2.1932 (flowers), fruits and leaves later, hedgerow.

Tedd 809 : Not corky. Leaves mainly ovate, acute and scarcely acuminate, main teeth with 2–3 smaller teeth on one side only, 10–12 veins, averaging 6·5–7 cm. long and 4·5 cm. broad, upper surface with short adpressed pubescence, not rough, lower surface

as 799; petiole 1 cm. long. Perianth 5–6-lobed. Stamens 4–5. Samaras oblong-obovate, notch 2·5 mm. deep, stigmata near apex of notch, 1·4 cm. long, 1 cm. broad (? not fully ripe), seed inserted well in upper half up to base of apical notch. More hairy than typical *U. nitens* Moench. Possibly a variety of *U. procera* Salisb. (*U. campestris* Auct.) or a hybrid.

Sakarka, 21.2.1932 (flowers), fruits and leaves later, hedgerow, row of trees.

Tedd 810: Not corky. Leaves mainly ovate, acute and scarcely acuminate, main teeth with 1–2 smaller teeth on one side only, 10–12 veins, averaging 4·6 cm. long and 3·4 cm. broad, upper surface with short evenly scattered pubescence, not rough, lower surface similar to 799; petiole 8 mm. long. Perianth 5-lobed. Stamens 4–5. Samaras oblong-obovate, notch 1·5–2·5 mm. deep, stigmata near apex of notch, 1·3 cm. long, 1 cm. broad, seed in middle half. Probably as No. 809.

Sakarka, 21.2.1932 (flowers), fruits and leaves later, hedgerow.

Tedd 811: Not corky. Glaucous bark of twigs. Leaves elongate-ovate, averaging 9 cm. long and 5·5 cm. broad, margin broadly toothed each main tooth with 2 to 5 smaller and rather irregular teeth on one side only, 10–12 veins, upper surface with short scattered pubescence, lower surface as 799; petiole 1–1·2 cm. long. Perianth 5-lobed. Stamens 4–5. Samaras obovate or elliptic-obovate, apical notch 2 mm. deep, 1·6 cm. long, 1·3 cm. broad, seed in middle half. Under *U. nitens* Moench.

Sakarka, 21.2.32 (flowers), fruits and leaves later, edge of field.

Tedd 818: Not corky. Leaves elongate-oblong to narrow elliptic, margin with mainly entire teeth, 14–16 veins on each side, upper surface with slight scattered pubescence and glands, lower surface with rather less pubescence between the secondary veins than in 799; petiole 6–7 mm. long. Perianth 5-lobed. Stamens 4. Samaras obovate to broadly obovate, apical notch 2·5–3 mm. deep, styles half way down, 1·3–1·4 cm. long, 1·2–1·3 cm. broad. *U. nitens* Moench var. *italica* Henry in Elwes and Henry, trees of Great Britain and Ireland vii. 1892 (1913).

Boyadjiler, 5.5.32 (leaves), arable land and pasture. Later in leaf than other specimens of elm, and bark apparently smoother.

Tedd 828: Young leaves asymmetrically elliptic, main teeth entire or with one smaller tooth on one side, upper surface of very short scattered hairs, probably becoming glabrescent, not rough, lower surface softly pubescent and with conspicuous axillary hair tufts. Perianth 5-lobed. Stamens 5. Samaras obovate, cuneate in lower part, apical notch 2 mm. deep, 1·4 cm. long, 9 mm. broad, seed in the upper half. Probably under *U. nitens* Moench.

Emirli, 200–300 m., 8.5.32 (young leaves and fruits), near stream side. Probably has suckers.

Tedd 127A: Corky. Leaves elongate-obovate, averaging 9·5 cm. long and 5 cm. broad, main teeth rather broad and irregular mostly with 1 to 3 smaller teeth on one side only, 10 to 12 veins,

upper surface with scattered adpressed hairs, rough, under surface with white tufts in leaf axils and also a fairly dense soft pubescence between the veins with scattered glands; petiole 1 cm. long. Perianth 5-lobed. Stamens 4–5. Stigmata hairy all round. Samaras broadly obovate-elliptic, apical notch 1–1·5 cm. deep with the stigmata near its apex, 1·5 cm. long, 1·4 cm. broad.

Appears nearest to *U. hollandica* Mill. (*U. major* Sm.), which is supposed to be of hybrid origin by some authors, the upper leaf-surface is, however, rough.

Kizildjakeuy, sea-level, 2.3.1930 (flowers), leaves later, near the shore of Lake Boru, in copse-land. 25–50 ft., suckers.

Tedd 127B: Not corky (?). Leaves elliptic to elliptic-obovate averaging 9·5 cm. long and 6 cm. (up to 7 cm.) broad, upper surface with few or no scattered adpressed hairs, rough to nearly smooth, lower surface with axillary tufts of white hairs, but between the veins nearly glabrous, few glands; secondary veins 9–12; petiole 5–6 mm. long. Perianth 5-lobed. Stamens 4. Nearest to *U. hollandica*. Mill.

Kizildjakeuy, 2.3.1930, farther inland than 127A, in hedgerows. Suckers.

Tedd 127C: Leaves asymmetrically elliptic, averaging 7·5 cm. long and 4·5 cm. broad, teeth entire or with 1 smaller tooth on one side, 12–14 veins, upper surface glabrescent or with few adpressed hairs, lower surface with white axillary tufts of hairs and pubescence between and on the veins with few intermixed glands; petioles 1 cm. long. Perianth 5-lobed. Stamens 4–5. Possibly a hybrid with *U. nitens* Moench for one parent.

Kizildjakeuy, 2.3.1930 (flowers), leaves later. From an old and much mutilated tree.

Tedd 127D: Flowering material only.

Denkler, 2.3.1930, in a Turkish cemetery.

Tedd 127E: Leafy material and samaras only. Leaves asymmetrically elliptic to ovate-elliptic, averaging 7·5 cm. long and 4·7 cm. broad, main teeth with 1–2 smaller teeth on one side only, 11–15 veins, upper surface glabrous or nearly glabrous, lower surface with axillary tufts of white hairs and short scattered pubescence on and between the secondary veins, petiole 1·1–1·2 cm. long. Samaras broadly elliptic to elliptic-obovate, apical notch 2·5–3 mm. deep, stigmata half-way down, 1·4 cm. long, 1·2–1·3 cm. broad. Under *U. nitens* Moench.

Near Ferizli, 1930.

Tedd 127F: Pollarded shoots only, leaves with persistent stipules. Leaves elongate-elliptic, averaging 10·5 cm. long and 5·5 cm. broad, main teeth rather broad and with usually 1–2 smaller teeth on one side only, upper surface nearly glabrous and not rough, under surface with axillary tufts of white hairs and short pubescence on and between the secondary veins mixed with glands; petioles up to 2 cm. long. Probably under *U. nitens* Moench.

Ferizli, 1930.

Tedd 127G : Sucker shoots. Young branches densely pubescent. Leaves small, many very small, averaging 2·8 cm. long and 2·7 cm. broad but varying much in actual size, 7–10 veins, main teeth very irregular entire or with 1–2 smaller teeth on one side only, upper surface very rough with asperous hairs and glands, lower surface thickly pubescent and with glands ; petioles 1–2 mm. long, leaves nearly sessile. Impossible to place with certainty. In many characters resembles specimens from Jersey, in Herb. Kew., named *U. stricta* var. *sarniensis*.

On sands near the sea at the mouth of the River Mesta, 1930.

It is hoped that the above descriptions will call attention to the need for further investigations of the elms of the Balkan Peninsula and will stimulate collectors to send good sets of specimens to Kew. It is only after carefully collected material from many areas has been examined that a definite nomenclature can be suggested. In Thrace the timber of the elm is called " Kara-agatch," i.e. black wood, in Turkish. The wood has the reputation, as elm wood elsewhere, of being very water resistant. No information has been obtained to show that carpenters, etc., distinguish different kinds. Most of the trees are regularly pollarded, which makes it difficult to find a tree showing its normal form.

While this paper was passing through the press, the following supplementary field-notes were received from Mr. Tedd :—

Tedd 797 : Bark corrugations about 3 cm. deep and 2·5 cm. wide, bark tending to split vertically rather than horizontally. Fair amount of corky excrescence ; colour of branches rusty-grey with striations parallel to length. Leaves (at 3 Dec.) yellow and brown but mostly still on tree. Main twigs stout with obtuse-angled branching. Suckers. Circumference of trunk at 1·5 m. is 2·62 m.

Tedd 798 : Bark corrugations about 2 cm. deep and 2 cm. wide, 2–3 cm. intervals. Branches rusty-grey without striations. Corrugations of bark (of trunk) with vertical tendency. Suckers. Circumference of trunk at 1·5 m. is 2·14 m.

Tedd 799 : Bark with vertical splits, corrugations 1·5 cm. deep, 2·5 wide, 2–2·5 cm. intervals. Branches grey with pronounced reddish cross-lenticels. No cork now visible. Suckers. Leaves almost all fallen. Young twigs fairly stout. Circumference 1·5 m.

Tedd 800 : Corrugations vertical, 2 cm. deep, 2 cm. wide, 2–3 cm. intervals ; corky growth on branches ; branches and twigs reddish. Suckers. Pollarded this year, green and yellow leaves still remaining, very few fallen. Circumference 2·26 m.

Tedd 801 : Vertical corrugation of bark. Branches and twigs reddish-grey, smooth, no striations, twigs stout. Suckers. No cork. Pollarded this year, few leaves yet fallen, mostly yellow now. Circumference 2·14 m.

Tedd 802 : Very gnarled trunk, probably tending to cross-corrugated type. Corky, branches greyish, young twigs and branches not so regularly obtuse-angled. Suckers.

Tedd 807: Gnarled trunk. Suckers. No cork. Branches greyish, twigs stout with typical obtuse-angled branching. Bark corrugations with vertical tendency; no leaves left on now; prominent cross-lenticels; tough bark on twigs.

Tedd 808: Young tree, 60 cm. round at 1·5 m. Suckers. No cork, branches grey, no striations, no prominent lenticels. Leaves nearly all fallen.

Tedd 809: Bark corrugations markedly of vertical type, corrugations 1–1·5 cm. deep, 1–3 cm. wide, average about 2 cm. Mature bark smoother than preceding. Branches with grey bark, smooth, twigs more delicate, acute-angled branching, pendulous at extremities. Suckers. No. cork. Leaves about half fallen, remainder yellow. Circumference of trunk 1·65 m. at 1·5 m. height from ground.

Tedd 810: Young tree, circumference 64 cm. Smooth grey bark, same type as No. 809. Corrugations on trunk just becoming characteristic, 30–40 mm. deep, 1 cm. wide, 50 mm. intervals, twigs delicate with acute-angled branching. No cork. Suckers probably, but it is possible that this young tree is itself a sucker. Leaves practically all shed.

Tedd 811: Smooth-trunk type, corrugations 1–1·5 cm. deep, 2 cm. wide, 1–1·5 cm. intervals. Vertical type of corrugations. Suckers. No cork; branches grey. Leaves mostly still on tree. Pollarded this year (summer). Twigs stout, with obtuse-angled branching. Circumference 1·82 m.

Tedd 818: Corrugations of trunk of cross-type, very rough, 3 cm. deep, width 4 cm. Branches and twigs greyish, with mostly slender young twigs with acute-angled branching. No cork. Suckers. Leaves yellow and brown and mostly fallen. Circumference at 1·5 m. is 2·62 m.

Corrugations of trunk. There are two types usually fairly distinct, and often clearly so. They are difficult to describe but easily recognised—the obvious difference being the presence or absence of horizontal splits in the old bark (described as horizontal or vertical type above).

Branching of twigs. Here there are also two characteristic types; the obtuse-angled is well shown by No. 805, and the acute by No. 806 (see specimens). The obtuse-angled type is commoner, and is mostly well shown in the outer and upper twigs, which stand out very clearly in winter.

Seedlings. It is possible that these are more frequent than one would suppose. Others have now been found in Xanthie on the roof of an old Turkish bath.

Bark of young branches. This seems to be quite different from the common English elm. It is very tough, and if a young branch is broken the bark tends to peel up the branch rather than break. The wood is also tougher than the English elm.

Diseases. No sign has been seen of anything which might be Dutch elm disease. A rust parasite which causes galls on the young branches infects many trees, especially those with corky bark.

Age. A trunk 1·5 m. in circumference showed 98–100 growth rings.

XXXI—DIOSCOREAE NOVAE ASIATICAE.

Dioscorea (Stenophora) Poilanei *Prain et Burkill*; species e grege *D. deltoideae* Wallich, et *D. Prazeri* Prain et Burkill, capsulis nitidis, intense aeneis et conspicue majoribus facillime discriminanda.

Caulis partes inferae cum partibus hypogaeis nondum visae, sed partes hypogaeae narcoticae et (teste Poilane) ad piscandum idoneae; partes superae lentae, glabrae, nitidae, leviter lineatae, 1·5 mm. diametientes, sinistrorsum volubiles. *Folia* alterna, tenuia, alte cordata vel subsagittata lobis basalibus rotundatis, margine minopere sinuata, apice brevius acuminata, 5–7-nervia: nervi paris primoris aream late ellipticam concludentes: nervi paris alterius vix ad mediam laminam extensi: nervi secundarii quam reticulatio vix magis conspicui: pagina supera glabra, nitida, nervis nervulisque parum elevatis: pagina infera glabra, vix nitida, nervis primariis distincte elevatis, ceteris cum nervulis paginae superae conformibus: folia maxima adhuc visa ad 10 cm. longa, ex adverso apicis petioli atque inter apices loborum basalium 6 cm. lata: petiolus nonnunquam stipulis parvis aculeiformibus armatus, 6 cm. longus. *Flores maris* ignoti: *feminae* in spicis brevibus pendulis dispositi. *Sepala* ovata, 1-nervia, nervo in carinam posticam elevato, 1·25 mm. longa. *Petala* quam sepala latiora et magis obtusa. *Capsulae* aeneae, politae, reflexae, imbricatae, stipite curvato et sursum minopere in alis expanso 5 mm. longo suffultae: alae ex apice stipitis usque ad vel saepius ultra mediam capsulam expansae: capsulae apice truncatae, ibique saepe vix angustiores quam ad partem latissimam, secus placentam 28–32 mm. longae, alis ad 15 mm. usque latis. *Semina* circumcirca alata: ala pallide hyalina.

Anam Boreale. In provincia Quang-Tri, apud Lang-Vieng-Ap ad 400 m., *Poilane* 10843 (typus, in Herb. Paris).

Dioscorea (Paramecocarpa) Petelotii *Prain et Burkill*; species ad *D. flabellifoliam* Prain et Burkill, proxime accedens, sed pubertate, capsularum magnitudine et praesertim foliorum forma apte distinguenda.

Partes hypogaeae adhuc ignotae. *Caulis* sinistrorsum volubilis, lineis elevatis perdistincte notatus, ad petiolorum insertiones aculeolis saepius binis nonnunquam ternis quaternisve obsitus, in regione florigena ad 3 mm. crassus, primo pilis minutis fulvastris mox deciduis obtectus. *Folia* alterna, simplicia, elongato-subdeltoidea, angulis basalibus rotunda: lamina prope basim ad 9 cm. lata, secus nervum medium ad 13 cm. longa, sub acumine 15 mm. longo plus minusve rotundata, 7-nervia, nervis paris primoris

a nervo medio sub angulo 40° diametienti excurrentibus aream intranerviam late oblanceolatam concludentibus, iis paris alterius a nervo medio sub angulo 75° diametienti divergentibus et versus mediam partem laminae marginis vel paulo ultra aequabiliter curvatis ; nervi secundarii anfracti areas intra nervos primarios inclusas perlustrantes quam reticulatio vix magis conspicui : pagina superiore glabra, fere nitida, nervis reticulationeque conspicuis aliquantulum elevatis : pagina inferiore pallidiore ad petioli insertionem et secus latera nervorum praecipuorum prominentium pilis minutis fulvastris induta : nervi primarii subtus prominentes, secundarii elevati : petioli ad 7 cm. longi, pilis minutis fulvastris tomentosi : pulvini non modo inferiores sed etiam superiores elongati. *Flores maris* ignoti. *Flores feminae* racemosi—racemum vidimus singulum flores octo gerentem, in his tres tantum fructuosi : axis racemi more petiolorum pilis minutis fulvastris lanuginosus : bracteae a basi lata ovatae, acutae, 2 mm. longae : pedicelli floriferi 3 mm. longi : ovarium ad 7 mm. longum. *Sepala* a basi lata ovata, uni-nervia, 1·5 mm. longa. *Petala* latiora. *Staminodia* minuta. *Stylorum* brachia tria, apice bifurcata. *Capsula* stipite 7–10 mm. longo suffulta : stipes sursum incrassatus atque ad capsulae basin 2 mm. latus : alae ab apice stipitis ad angulam 90° diametientem divergentes, marginibus subparallelis atque ob eam causam capsula cum longitudine secus placentam 60 mm. metiente latitudinem ad basim atque sub apicem rotundatum 7 mm. sed in mediam partem 10 mm. metiente ostendit. *Semina* circumcirca alata sed margine apicem capsulae spectante distincte latiore quam margo basim spectans, in quoque loculo parum remota, inferius ad 10 mm. supra basin placentae, superius versus mediam placentam affixum.

Tonkin. Provincia Lao-Kay, inter Cha-pa et Muong Hoa ad 1400 m., in mense Augusto fructigena, *Pételot* 4.395 (typus, in Herb. Kew.).

Dioscorea (Illigerastrum) dissimulans *Prain et Burkill* ; species capsulis et seminibus cum eis specierum sectionis *Stenophorae* conformibus, sed ob folia ternata foliolo centrali palmatim venoso et ob flores ambitu orbiculares una cum *D. simulante* Prain et Burkill, *Illigerastris** ascribenda : vix cum ceteris *Dioscorearum* asiaticarum

*__Illigerastrum__ *Prain et Burkill* ; generis *Dioscoreae* sectio nova capsulis seminibusque cum sectione *Stenophora* congruens et foliis aliquantum cum sectione *Lasiophytoni* congruens, sed floribus a sectionibus omnibus Asiaticis generis plane distincta. *Caulis* sinistrorsum volubilis. *Folia* alterna, trifoliata : foliolum medium trinerve, nervis paris primoris apicem ut videtur eglandulosum attingentibus : foliola lateralia petiolulata, ex relatione ad nervum primarium oblique asymetrica. *Flores* maris (in *D. simulanti* tantum adhuc noti) in cymulis parvulis aggregati. *Cymuli* secus axin inflorescentiae racemosim dispositi et versus rhachidis apicem ad flores singulos reducti. *Perianthium* sub anthesin ambitu plus minusve orbiculare. *Stamina* 6. *Flores feminae* in racemis simplicibus spiciformibus dispositi, perianthio ambitu plus minusve orbiculari. *Capsulae* reflexae, alis quam latis parum longioribus. *Semina* circumcirca alata.—Species 2, altera Chinae australis, altera Anam borealis incolae.

comparanda : a *D. simulante*, ob folia subcoriacea foliolis lateralibus apice rotundatis apte distinguenda.

Caulis sinistrorsum volubilis, ad 6 m. altus (teste Poilane) : partes superae tantum visae, firmae et lentiores, glabrae, leviter lineatae : caulis partes inferae cum partibus hypogaeis adhuc ignotae. *Folia* alterna, trifoliata, subcoriacea : foliolum medium ovato-ellipticum, basi obtusum, apice acutum nec acuminatum, ad 8 cm. longum, ad 3·5 cm. latum, 5-nerve : nervi paris primoris aream oblanceolatam concludentes : nervi paris alterius fere submarginales : nervi secundarii aream intranerviam vix manifeste transcurrentes sed nervulis aeque distinctis nervis primordiis parallelis et ab his enatis sese immiscentes : pagina supra glabra, nitida, nervis nervulisque distinctis, infra nervis nervulisque magis prominentibus : foliola lateralia ad 5·5 cm. longa, ad 2·5 cm. lata, ex relatione ad nervum primarium tantum asymetrica ut partes extra nervum formam folii ovati dimidiati, eae intra nervum formam folii oblanceolati dimidiati in memoriam revocant, apice rotundata, ad basin versus in petiolulum 3 mm. longum attenuata : petiolus glaber, ad 3 cm. longus. *Flores maris* adhuc ignoti : *feminae* pedicellati in racemis pendulis dispositi : axis racemi fere rectus, glaber, lineis elevatis notatus, ad 15 cm. longus : pedicellus unusquisque stipite proprio suffultus, sub anthesin cum stipite 2–3 mm. longus, demum reflexus : bracteae ad conjunctionem pedicelli cum stipite, lanceolatae, 1 mm. longae. *Sepala* lanceolato-ovata, subhorizontalia, vel apice minopere decurva et marginibus apicem versus recurvis, minute velutina, 2·25 mm. longa. *Petala* sepalis conformia sed sub anthesin plenum adscendentia. *Staminodia* 3, petalis opposita. *Stigmata* e paribus 3 labiarum curvatarum composita. *Capsulae* reflexae, aeneae, pernitidae : pedicellus cum stipite nunc ad 8 mm. longus, sutura placentalis 25–28 mm. longa : alae supra medium ubi latissimae 18 mm. latae, apice truncatae. *Seminis* corpuscula 8 mm. longa 5 mm. lata, circumcirca alata : ala pallide brunnea.

Anam Boreale. In provincia Quang-Nam : apud Ba-na prope Tourane, ad 1200 m., *Poilane* 7242 (typus, in Herb. Paris.).

Dioscorea (Lasiophyton) filicaulis *Prain et Burkill* ; species inter affines minima, *D. arachidnae* Prain et Burkill, proxima.

Tubera ignota. *Caulis* pergracilis, glaber vel pilis perpaucis ad innovationes minutissime indutus, sinistrorsum volubilis. *Bulbilli* ignoti. *Folia* alterna, trifoliata, supra glabrescentia, hebetia, infra pilis sparsis albis obsita : foliolum medium ellipticolanceolatum vel subovatum, basi subacutum, apice acutum mucronulatum, nervis pinnatis : foliola lateralia inaequilatera—omnia 6 cm. longa, ad 2·2 cm. lata : petiolus ad 2 cm. longus. *Flores maris* ignoti. *Flores feminae* in spicis unicis axillaribus decurvatis dispositi : axis minute pubescens, deinde glabrescens, 0·5 mm. diametiens : bracteae ovato-lanceolatae, ovarii basin amplectentes, 1 mm. longae. *Sepala* ovato-orbicularia, glabra, 0·75 mm. longa. *Petala* conformia, nisi minora et tenuiora. *Staminodia* minuta.

Capsulae reflexae : stipes 1 mm. longus : alae semi-ellipticae, apice rotundatae, ad 13 mm. tantum longae, ad 5 mm. latae. *Semina* basin versus alata.

SIAM. In comitatu Rachasima, ad Aran Pratet, *Put* 2087 (typus, in Herb. Kew.) ; in comitatu Nakawn Chaisi, apud Dom Bang, Supan, *Kerr* 19702 a.

Dioscorea (Enantiophyllum) Potanini *Prain et Burkill* ; species e grege *D. oppositae* Thunb. et *D. japonicae*, Thunb. ; ab ambabus differt foliis crassitudine tenuioribus, propter auriculas basales rotundatas conspicuas fere trilobis.

Planta omnino glabra. *Tubera* adhuc ignota. *Caules* graciles, parum cristati, dextrorsum volubiles. *Bulbilli* adhuc ignoti. *Folia* tenuia, opposita vel perraro terna, propter auriculas fere tripartita, 7-nervia ; laminae parte centrali lineari-lanceolata ad 7 cm. longa, auriculis basalibus a lateribus ex transverso expansis, ad 2 cm. diametro : areola intranervia interior clausa anguste lineari-lanceolata : pagina superior levis, nervis distinctis : pagina inferior similis sed nervis primariis paululum prominentibus : petiolus quam lamina dimidio brevior. *Spicae maris* 2–4-nae, axillares : axis ad 3 cm. longus, plus-minusve 20-florus, pertenuis, leviter inflexus : bracteae ovato-lanceolatae, vix reflexae. *Sepala* ovata, 1 mm. longa vel paululo longiora. *Petala* sepalis minora. *Stamina* sex. *Florum feminae sepala* ovata, vix 1 mm. longa. *Petala* sepalis minora. *Capsulae* pallidae, stipite 2 mm. longo : alae quam semicirculus latiores, 14–15 mm. longae, 10 mm. latae. *Semina* circumcirca alata, loculo conformia, rufo-fulvescentia.

CHINA. In provinciae Ho-nan comitatu Teng-fong Hsien, ad 670 m., *Schindler* 143 ; in provincia Hu-peh, Nan-t'o vel boream versus, *Henry* 2023 ; in provincia Sze-chuan, in monte Omi, *Potanin* (typus, in Herb. Petropol.) ; in provinciae Yun-nan comitatu Kaing-you Hsien, in montibus Kuan-wu Shan ad 1300 m., *F. T. Wang* 22242 ; ad Mo-so-yn, *Delavay*.

Dioscorea (Enantiophyllum) intempestiva *Prain et Burkill* ; species e grege *D. cirrhosae* Loureiro, quoad foliorum figuram et capsularum formam cum *D. laurifolia* Wallich, ad amussim congruens : sed foliis exsiccatis rubentibus, alabastris basi latioribus, spicis maris exadverso geotropicis, et praesertim habitudine florifera atque fructifera qua tempestate species ceterae sectionis *Enantiophylli* cognatae pullulant manifeste differt.

Tubera nobis ignota, sed (teste Poilane) foris rubescentia ad vescendum apta vix tamen esculenta. *Caulis* dextrorsum volubilis ad 12 m. usque altus : partes superae tantum visae inermes, glabrae, lentae, leviter lineis longitudinalibus notatae, ad 5 mm. diametientes. *Folia* exsiccata rubentia, alterna vel rarius opposita, coriacea, anguste ovata vel ovata, basi obtusa vel rotundata, apice breviter acuminata, saepissime ad 10 cm. longa, saepius ad 4 cm., interdum ad 6 cm. lata, 5-nervia vel quandoque 7-nervia : nervi paris primoris a

nervo centrali ad angulum 30° metientem divergentes aream late oblanceolatam versus apicem acuminatam concludentes : nervi paris alterius in foliis 5-nervibus ad angulum 60° metientem a nervo centrali divergentes sub marginem paginae ad apicem folii usque percurrent : nervi secundarii areas internervias saepius recte sed subinde anfractuose transcurrentes, semper tamen reticulatione conspicue implicati : margine distincte aucto : facie supera glabra nervis omnibus prominulis : facie infera nervis primariis prominentibus, ceteris prominulis : nervis majoribus rubentibus. *Flores maris* in spicis dispositi : spicae (an semper) axillares : axis angulosus, ad 4 cm. longus : bracteae ovato-acuminatae, sub basin alabastri explanatam retrusae, 1 mm. longae ; bracteolae latissime deltoideae. *Sepala* quadrato-ovata, obtusa, 1·25 mm. longa. *Petala* ovata, sepalis breviora. *Stamina* 6, 0·5 mm. longa, antherae quam filamenta parum longiores. *Gynoecium* parvum, 3-punctatum. *Flores feminae* secus spicas pendulas dispositi : axis spicae glaber, angulatus : bracteae ovato-subulatae, 1 mm. longae. *Sepala* crassa, late ovata, 1 mm. longa. *Petala* crassa, sub-obovata, 0·75 mm. longa. *Stigmata* e paribus hamorum 3 composita. *Capsulae* stipitatae in spica singula ad 16 usque, hebetes, fulvae : stipes ad 5 mm. longus, sursum explanatus ad 4 mm. diametiens : alae ad apicem truncatum fere aequabiliter curvatae, secus placentam 22–26 mm. longae, ubi latissimae 18–20 mm. latae. *Semina* loculis conformia, circumcirca alata : ala brunneo-rubescens.

Anam Boreale. In Provincia Quang-Tri, in montibus Dong-Tain-Ve ad 700 m., *Poilane* 10825 ; apud Lang-Vieng-Ap, *Poilane* 10879 (typus) ; in montibus Dong-Cho ad 600 m., *Poilane* 10717, 11246 ; apud Mai-Lanh ad 400 m., *Poilane* 10440. Exempla omnia in Herb. Paris.

Dioscorea (Enantiophyllum) Bonii *Prain et Burkill* ; species *D. cirrhosae* Loureiro, proxima, alabastris globosis, floribus minoribus, et foliis herbaceis subtus pruinosis facile distinguenda.

Caulis dextrorsum volubilis, partes inferae et hypogaeae nondum obviae : partes superae inermes, 5 mm. diametientes ramos laterales 3–4 mm. diametientes emittentes : rami rigidi primo foliis alternis denique foliis oppositis vel quandoque ternariis suppediti, glabri, lineis in longitudinem leviter elevatis induti. *Folia* nunc lanceolata, nunc late lanceolata, basi obtusa vel rotundata, apice acuta vel aliquatenus acuminata, ad 8 cm. longa et subinde ad 2·5 cm. sed saepius 1·5 cm. tantum lata, 3–5-nervia : nervi paris primoris a nervo centrali ad angulum 30° metientem divergentes et aream lanceolatam concludentes : nervi paris alterius a centrali ad angulum 60° metientem emissi in partem laminae basalem dilapsi : nervi secundarii aream intranerviam more anfracto transcurrentes : pagina supera glabra, hebetia, levia, nervis primariis distinctis ceteris vix manifestis : pagina infera nervis primariis prominentibus exceptis pruinosa, nervis secundariis manifestis sed reticulatione vix conspicua : petiolus 2 cm. longus. *Flores maris* in spicis dispositi :

spicae secus axin inflorescentiae efoliatae ad 8 cm. sed saepius 4 cm. tantum longum instructae : axis inflorescentiae angulosus, glaber : spicae internodiis inflorescentiae longiores : alabastra globosa : bracteae lanceolatae, 1 mm. longae, a basibus alabastrorum repressae: bracteolae triangulares, 0·5 mm. longae. *Sepala* ovata, glabra, 1 mm. longa. *Petala* obovata, sepalis paululum breviora. *Stamina* 6, 0·5 mm. longa, filamentis perbrevibus.

Tonkin Occidentale. Loco incerto, *Bon* 4321 (typus, in Herb. Paris.).

Dioscorea (Enantiophyllum) lamprocaula *Prain et Burkill*; species inter orientales sectionis apte distinguenda caulibus stramineis valide aculeatis, foliis coriaceis, inflorescentiis elongatis, alabastris obovoideo-pyriformibus.

Planta omnino glabra. *Tubera* ignota. *Caules* straminei ad 7 mm. crassi, dextrorsum volubiles, aculeis 3–4 mm. longis armati. *Bulbilli* magni, pyriformes vel digitati. *Folia* alterna, coriacea, marginata, 5–7-nervia : majora latissime ovata, ad 17 cm. longa, ad 13 cm. lata, vel subinde fere orbicularia : areola intranervia interior clausa elliptico-ovata : folia media anguste ovata, ad 11 cm. longa, ad 6 cm. lata : pagina superior nervis elevatis modice distinctis : pagina inferior similis nisi pallidior, nervis minoribus sed primariis prominentibus : petiolus laminae dimidio vix aequilongus. *Flores maris* in inflorescentias aphyllas elongatas congregati : spicae ab axin divergentes, ad 5 cm. longae ; bracteae triangulari-ovatae, 0·5 mm. longae, mucronatae, opere floris basis vix repressae : alabastra globosa. *Sepala* 1·25 mm. longa, obovata, apice rotundata, incurvata, fere 1 mm. lata. *Petala* sepalis minora, orbiculari-obovata, apice rotundata, 0·75 mm. lata, vix opaca. *Stamina* sex, 0·5 mm. longa. *Flores feminae* ignoti.

Sumatra. In provincia " East Coast " nuncupata, Sibolangit ad 500 m., *Lörzing* 5158 (typus, in Herb. Hort. Bot. Buitenzorg) ; Bukit Semaik, prope Sibolangit, *Mohamed Nur* 7376.

Malaya. In principatu Perak, in cacumine Gunong Hijau, altitudine 1256 m., *Mohamed Haniff et Mohamed Nur* 2454 ; in principatu Pahang, apud speluncas Kota Glanggi, *Henderson* : in principatu Johor, ad rivos fluminis Sedili, *Corner*.

Dioscorea (Enantiophyllum) depauperata *Prain et Burkill*; species ut videtur calcicola, ex affinitate *D. alatae* Linn., eamque maxime spicis flexis accedens sed spicis singulis paucifloribus in axillis sitis nec in inflorescentias aggregatis.

Planta omnino glabra. *Tuber* unicum alte in terram descendens, carne album ad vescandum aptum. *Caules* basin versus angulati, colore cuprei, dextrorsum volubiles. *Bulbilli* adhuc ignoti. *Folia* nisi ima et superiora opposita, hastata vel auriculato-hastata vel subsagittata vel minima subovata, 5–7-nervia : majora 8 cm. longa 5 cm. lata : areola intranervia interior clausa lanceolata : pagina superior hebes, nervis primariis distinctis : pagina inferior pallidior,

nervis rufescentibus elevatis : petiolus parum alatus quam dimidium laminae paululo longior. *Spicae maris* fere semper in foliorum vel bractearum axillis sitae nec in inflorescentias proprias aggregatae : axes flexi, plus minusve 10-flori. *Alabastra* globosa : bracteae ovatae, subacuminatae, 0·75 mm. longae. *Sepala* ovata, perobtusa, 1·25 mm. longa, basin versus dorso cristata, marginibus tenuia. *Petala* obovata, crassa, 1 mm. longa. *Stamina* sex. *Spicae feminae* axillares, plus minusve 10-florae : bracteae ovatae. *Sepala* rotundato-ovata, 1 mm. longa. *Petala* similia nisi minora. *Capsulae* colore cupreae : stipes 3–4 mm. longus : alae fere semicirculares, sed apice retusae, 15 mm. longae, 8 mm. latae vel paulum majores.

SIAM. In comitatu Rachaburi, prope Kanburi in collibus calcareis, Sai Yok, versus 500 m., *Marcan* 2400, *Put* 1804. Kao Tawng, infra 100 m., *Kerr* 19643, 19647, 19648 (typus, in Herb. Kew.); in comitatu Rachasima, ad Aran Pratet, *Put* 3128.

LAOS. In comitatu Saravane, ad Samia, *Poilane* 18495.

XXXII—AFRICAN ORCHIDS : V.* V. S. SUMMERHAYES.

Cynorchis debilis *Summerhayes*, comb. nov. *Habenaria debilis* Hook. f. in Journ. Linn. Soc. Lond. **7,** 221 (1864).

It seems clear on examination of this species that it is correctly placed in *Cynorchis*. Features supporting this view are the glandular pubescent scape and ovaries and the five-lobed lip. This latter has been described previously as three-lobed but in addition to the three main lobes there is also a small tooth-like lobe on each side near the base. In *C. Johnsoni* Rolfe, which also has a five-lobed lip, the basal lobes are shorter than the others and *C. debilis* may be considered as showing a further reduction from this towards a three-lobed lip. The other features of the flower also agree with *Cynorchis*, the stigmas being partially united to the side lobes of the rostellum.

Habenaria occidentalis *Summerhayes*, comb. nov. *Amphorchis occidentalis* Lindl. in Journ. Linn. Soc. Lond. **6,** 139 (1862). *Cynorchis occidentalis* Dur. & Schinz, Conspect. Fl. Afr. **5,** 92 (1892).

An examination of the type specimen of this species shows that its correct position is not in the genus *Cynorchis*, but that it belongs to a group of species placed in the genus *Habenaria* and remarkable for their inverted, hairy flowers. These species, namely, *H. villosa* Rolfe, *H. aberrans* Schltr. and *H. Snowdenii* Summerhayes are placed in the section *Diphyllae* and *H. occidentalis* agrees in possessing the broad adpressed radical leaf characteristic of the species of this section. The species differs from all species of *Cynorchis* known to me by possessing bilobed petals, a feature which it shares with the *Habenaria* species mentioned above, although in *H. occidentalis* the petals are divided only at the apex. The orange flowers are another feature militating against its inclusion in *Cynorchis* since that genus possesses usually pink or purplish more rarely white ones.

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*Continued from *K.B.* 1932, 344.

In all the species the rostellum middle-lobe, although slightly concave, is very similar to that in many other species of *Habenaria*. *H. occidentalis* is characterised by the presence of a thickened ridge or keel running down the centre of the lip.

I have already given a key to the species of this group (*Kew Bull.* 1931, p. 381). *H. occidentalis* may be separated from the remainder as follows :—

Lip trilobed for a quarter of its length, lobes 1·5–2 mm. long ; spur erect, somewhat incurved, 15 mm. long...*H. occidentalis*.

Lip trilobed to the middle or below, lobes 4 mm. or more long ; spur erect, 8–9 mm. long, or pendulous, 15 mm. long..... *remainder of species* (see key).

Habenaria malacophylla *Rchb. f.* in Otia Bot. Hamburg. **2,** 97 (1881). *H. Holstii* Kraenzl. in Engl. Jahrb. **19,** 246 (1894). *H. pulla* Schltr. in Engl. Jahrb. **55,** 497 (1915).

An examination of the type specimens of these three species, as well as specimens from other localities such as Abyssinia and the Virunga Mountains, has convinced me that they must be referred to one species. The variations found are such as might be expected to occur in a widely spread species, but allowing for these the structure of the flowers is really remarkably uniform. The species as here delimited is consequently distributed from Eritrea in the north through East Africa to Natal and Griqualand East. It is an inhabitant of forests which doubtless accounts for the relatively large gaps in our knowledge of its exact distribution within the general outline given above.

It should be noticed that *H. Holstii* is included in the Flora of Tropical Africa among those species with narrow leaves (see key, p. 209) and is thus widely separated from *H. malacophylla* in the enumeration of the species. However, in the description on p. 238 the leaves are given as being " $1\frac{1}{4}$-2 in. broad " which measurements are actually greater than those given for *H. malacophylla*, viz. 8–12 lin., although in length there is little to choose between the two species. A similar error has been made in the key with respect to *H. Buettneriana* Kraenzl., which is a closely allied species differing in the reflexed dorsal sepal and more slender spur.

Habenaria petitiana *Durand & Schinz*, Conspect. Fl. Afr. **5,** 83 (1892). *Herminium Steudneri* Rchb. f. Otia Bot. Hamburg. **2,** 109 (1881). *Platanthera volkensiana* Kraenzl. in Engl. Pflanzenw. Ost.-Afr. C. 151 (1895). *Peristylus Snowdenii* Rolfe in Kew Bull. 1918, 237. *P. ugandensis* Rolfe, l.c.

Examination of the type specimens or authentic material of the above species makes it clear that they should be referred to one species. The species have all been placed in the genus *Peristylus* Bl. by Rolfe but an investigation of the African and Indian species of this genus has convinced me that it cannot be maintained as distinct from *Habenaria*. The very short stigmas, absence of anther

canals and other supposedly distinguishing characters can be found in species of *Habenaria* which in other respects are very similar to the species included in *Peristylus*. Such, for instance, is the group of species allied to *Habenaria Rendlei* Rolfe on the one hand, and the group centred around *H. malacophylla* Rchb. f. on the other.

The following new combination is necessary in view of the above decision :—

Habenaria brachylobos *Summerhayes*, comb. nov. *Peristylus brachylobos* Summerhayes in Kew Bull. 1931, 382.

Habenaria (§ Cultratae) Tweedieae *Summerhayes*, sp. nov. ; affinis *H. cultriformi* Kraenzl. et *H. incomptae* Kraenzl., a quibus sepalis lateralibus semi-ovatis vel semi-orbicularibus subacutis nec lateraliter apiculatis, sepalo intermedio longiore, petali partitione postica haud fimbriata, partitione antica basi haud subito dilatata, rostelli lobo intermedio antheram bene superante differt.

Herba terrestris, robusta, erecta, 45–60 cm. alta ; tuber elongato-ovoideum, 4 cm. longum, ultra 1 cm. diametro. *Caulis* teres, basi cataphyllis paucis instructus, 6–8-foliatus. *Folia* lanceolata, acuminata, basi vaginantia, intermedia usque 9 cm. longa et 2·5 cm. lata, sursum sensim decrescentia in bracteas abeuntia. *Racemus* 15–25 cm. longus, circiter 5 cm. diametro, subdense multiflorus ; bracteae lanceolatae, acuminatae, ovarium pedicellatum subaequantes vel paulo superantes, extra et praesertim marginibus glanduloso-pubescentes. *Flores* suberecti, verosimiliter virides ; ovarium pedicellatum 2·5–4 cm. longum. *Sepalum* intermedium ovatum, acutum, carinato-concavum, 5·5–7 mm. longum, 2·5–4 mm. latum, extra sparse pubescens, carina basi scabridula ; sepala lateralia semi-ovata vel semi-orbicularia, margine anteriore valde dilatata, oblique subacuta vel obtuse acuminata, 8–10 mm. longa, 5–6·5 mm. lata, extra sparse pubescentia. *Petala* bipartita ; partitio posterior lineari-ligulata, subacuta, 6–6·5 mm. longa, 0·7–1·5 mm. lata, papilloso-puberula ; partitio anterior multo major, subfalcatim lanceolato-cultriformis, obtusa, 10–11 mm. longa, basin versus 1·8–2·2 mm. lata, papilloso-puberula. *Labellum* ex ungue circiter 1 mm. longo tripartitum ; partitio intermedia linearis, obtusa, 10–12 mm. longa, 0·8–1·4 mm. lata, subcarnosa ; partitiones laterales anguste lineares, 5–6·5 mm. longae, 0·3–0·5 mm. latae ; calcar dependens, dimidio inferiore cylindricum, apice clavato-inflatum, obtusum, circiter 2·5 cm. longum. *Anthera* subdeclinata, 2·5–3 mm. alta, obtusa, canalibus apice leviter incurvatis 2·7–3 mm. longis, staminodiis bilobis. *Brachia* stigmatifera crassa, clavata, 3·5–5 mm. longa, antherae canales aequantia vel paulo excedentia. *Rostelli* lobus intermedius ligulatus, apice triangulari-acutus, 2·5–3·2 mm. longus, antheram bene superans ; lobi laterales ab intermedio angulo recto divergentes.

Kenya Colony. Mt. Elgon, 6700 ft., Nov. 1931, *Tweedie* 25 (type). Nandi District, 6000 ft., Nov. 1898, *Whyte*.

Uganda. Mt. Elgon, Butandiga, on rocky knoll, 7000 ft., in fruit, Jan. 1918, *Dummer* 3646. Ruwenzori, 7000 ft., *Dawe* 670a.

The four specimens cited above agree well with one another and show constant differences from *H. cultriformis* Kraenzl., which is their closest ally. It appears that the species is generally distributed on the mountains of western Kenya and Uganda at about 6–7000 ft. altitude.

Habenaria Kilimanjari *Rchb. f.* in Otia Bot. Hamburg. **2,** 119 (1881). *H. Uhligii* Kraenzl. in Engl. Jahrb. **43,** 396 (1909). *H. lutaria* Schltr. in Engl. Jahrb. **53,** 515 (1915). *H. Theodori* Kraenzl. in Vierteljahrsschr. Nat. Ges. Zürich, **74,** 107 (1929).

There is no doubt that the above four " species " are really one and the same, as an examination of the type specimens shows. The remarkable feature of the species is the prolongation of each of the lateral lobes of the rostellum into a pincer-like process in which the much enlarged gland is held. Although the flower structure is remarkably constant in most details the posterior lobes of the petals show considerable variation, the posterior margin being angled or drawn out into a definite lateral tooth. Flowers on Uhlig No. 11 show this tooth well developed, but in the flowers of Uhlig No. 1 (the other syn-type specimen of *H. Uhligii* Kraenzl.) the tooth is only weakly developed while other specimens show every intermediate to the slightly angled petal-lobes of *H. Kilimanjari* type.

The distribution of the species according to the specimens I have seen is S. Kenya, Tanganyika, S.W. Belgian Congo and Nyasaland.

In *H. martialis* Rchb. f. we have a close ally of *H. Kilimanjari,* the flowers possessing the same pincer-like structure of the rostellum side-lobes while the general construction of the flowers agrees closely. The posterior petal-lobes are narrower and more acuminate while the flowers themselves are much smaller. I strongly suspect that this species really only represents a small form or individual of *H. Kilimanjari* but until more intermediate material is available it is advisable to maintain the two as distinct species.

Habenaria (§ Bilabrellae) angustissima *Summerhayes,* sp. nov.; *H. ichneumoneae* Lindl. similis, sed statura minore, inflorescentiis 3–5-floris, ovario pedicellato breviore, petali lobo posteriore quam anteriore duplo latiore, calcari satis breviore facile distinguenda.

Herba terrestris, gracilis, erecta, 15–30 cm. alta; tuber non visum. *Folia* 3–6, infimum ad vaginam redactum, intermedia linearia, acutissima, 4–10 cm. longa, usque 7 mm. lata, suprema in bracteas abeuntia. *Racemus* laxe 3–5-florus, 4–7 cm. longus; bracteae lanceolatae, aristato-acuminatae, usque 11 mm. longae. *Flores* suberecti vel erecto-patentes, ovario pedicellato 1–1·5 cm. longo. *Sepalum* intermedium elliptico-ovatum, subacutum, 5·5–5·8 mm. longum, 3–3·5 mm. latum; sepala lateralia oblique cuneato-obovata, lateraliter apiculata, 7–7·5 mm. longa, 3–3·5 mm.

lata. *Petala* bipartita ; partitio posterior rhomboideo-elliptica, apice acuta, basi angustata, 5–5·5 mm. longa, 2·2–2·5 mm. lata, ciliolata ; partitio anterior oblanceolato-ligulata, acuta, 6–6·5 mm. longa, 0·8–1 mm. lata, papillato-puberula. *Labellum* ex ungue 1–1·5 mm. longo tripartitum ; partitiones anguste lineares, 0·4 mm. latae, intermedia 8–8·5 mm. longa, laterales 5·5 mm. longae ; calcar rectum, cylindricum, apice paulo dilatatum, obtusum, 7–8 mm. longum. *Anthera* 3·5–4 mm. alta, apice obtuse apiculata, canalibus gracilibus leviter incurvatis apice cum rostelli lobis lateralibus leviter clavatis 5 mm. longis ; staminodia biloba, 0·7 mm. longa. *Processus* stigmatiferi graciles, apice capitati, 5·5 mm. longi ; rostelli lobus intermedius subulatus, subacutus, 2·4 mm. longus.

French Guinea. Mamou, Aug. 1907, *Pobéguin* 1680 (type in Herb. Mus. Paris.).

A small, rather slender species, very reminiscent of *H. ichneumonea* Lindl. but differing in quite a number of minor features and possibly more nearly related to some other species of Sect. Bilabrellae. It shares with *H. ichneumonea* the extremely narrow leaves. Perhaps the most interesting feature is the broad posterior petal-lobe, which is much wider than the anterior lobe.

Platycoryne megalorrhyncha *Summerhayes*, sp. nov. ; affinis *P. tenuicauli* Rolfe, a qua caule magis foliato, floribus minoribus, anthera obtusa nec longe apiculata canalibus brevioribus, brachiis stigmatiferis apice ovato-dilatatis antherae canales excedentibus, rostelli lobo intermedio antheram bene superante differt.

Herba terrestris, gracilis, omnino glabra, 20–30 cm. alta. *Caulis* foliatus, erectus, teres, basi cataphyllis paucis acutis vaginantibus instructus. *Folia* lanceolata vel lineari-lanceolata, acutissima, basi caulem amplectentia, usque 5 cm. longa et 9 mm. lata, superiora minora. *Racemus* 3–4 cm. longus, circiter 2 cm. diametro, dense 6–7-florus ; bracteae lanceolatae, subaristato-acuminatae, ovario pedicellato saepius breviores, usque 2 cm. longae. *Flores* suberecti, ovario pedicellato circiter 1·7 cm. longo. *Sepalum* intermedium ovatum, acutum, carinato-concavum, 7 mm. longum, 4·5 mm. latum ; sepala lateralia oblique oblongo-lanceolata, subacuta, 7·5 mm. longa, 2·5 mm. lata. *Petala* e basi latiore falcatim ligulata, acuta, 6·5 mm. longa, 1 mm. lata. *Labellum* simplex, anguste linguiforme, carnosum, marginibus recurvatis, 6·5 mm. longum, 1·3 mm. latum (explanatum) ; calcar dependens, cylindricum, dimidio superiore clavato-inflatum, obtusum, 14 mm. longum. *Anthera* erecta, obtusa, 3·5 mm. alta, canalibus porrectis crassiusculis 2·5 mm. longis. *Brachia* stigmatifera crassa, apice ovata dilatata, 2·5 mm. longa, antherae canales paulo excedentia. *Rostelli* lobus intermedius e basi latiore oblongo-lanceolatus, acutus, 2·4 mm. longus, 1·2 mm. latus ; lobi laterales basi latissimi ab intermedio sinu lato rotundato sejuncti.

Southern Nigeria. Bamenda District, Fougom, in boggy ground, 3500 ft., April 1931, *Maitland* 1509 (type).

The large rostellum is placed in front of and is quite distinct from the column which it overtops. The front lobe widens at the base and the margin curves downwards almost to the apex of the anther canals, it therefore being very difficult to delimit the front and side lobes. The stigmata are widened at the apex into flattened somewhat concave ovate receptive surfaces. *P. tenuicaulis* Rolfe has a similar type of rostellum but the middle lobe is smaller and the anther canals much longer ; the stigmata are also differently shaped and smaller.

Roeperocharis Rchb. f.

This genus, as originally proposed by Reichenbach, consisted of a number of Abyssinian species with a remarkably constructed column, the essential features of which were the division of the column into two almost separate portions, the placing of the two anther loculi at some distance from one another at the two ends, the absence of any middle lobe to the rostellum, and the division of each stigmatic process into two lobes, one prolonged downwards as in *Habenaria* and the other upwards in the opposite direction.

Since then a number of quite incongruous forms have been added to the genus so that it is virtually impossible to distinguish it from *Habenaria* by any adequate characters.

Kraenzlin first added *R. occidentalis* Kraenzl., a West African species. This plant has of the features given above only the separation of the anther loculi, a character which is also found in Sect. Multipartitae of *Habenaria*. The rostellum and stigmata are quite like those of *Habenaria* with the exception of a small apparent outgrowth on the upper side of the stigmata near the apex. This, however, is nothing like that in the other species of *Roeperocharis*.

Later on Kraenzlin, without having seen the species, transferred *Habenaria Rendlei* Rolfe to *Roeperocharis*, and later Schlechter transferred three other allied species, namely, *H. combusta* Ridl., *H. peristyloides* A. Rich. and *H. cardiochila* Kraenzl. He also described a further species of *Roeperocharis*, *R. ukingensis* Schltr., which was said to be closely allied to *R. Rendlei* Kraenzl.

I have examined three of these species and the structure of the column is, in my opinion, totally unlike that of the true species of *Roeperocharis*. The two anther loculi are quite adjacent, the column being undivided, the middle lobe of the rostellum is large and entire while the stigmatic processes are quite undivided. In general structure, indeed, the species all approach very closely to such species as *Habenaria Montolivoea* Kraenzl., *H. lefebureanus* Dur. et Schinz and a number of Indian species. Most of the above have been referred to the genus *Peristylus*, which, however, cannot be distinguished from *Habenaria*, and which is not closely related to *Roeperocharis*.

So far as I can see from my own dissections and from illustrations and descriptions the genus consists of the following six species, but it is possible that one or two of these may on examination prove to

belong to *Habenaria* :—*R. Bennettiana* Rchb. f., *R. urbaniana* Kraenzl., *R. platyanthera*, Rchb. f., *R. alcicornis* Kraenzl., *R. elata* Schltr., and *R. Wentzeliana* Kraenzl.

Of the remaining six species formerly referred to the genus, *R. ukingensis* Schltr. is seen on examination to be the same as *H. Rendlei* Rolfe, while the others, with the exception of *R. occidentalis* Kraenzl., were originally described in *Habenaria*, viz. *H. Rendlei* Rolfe, *H. combusta* Ridl., *H. peristyloides* A. Rich. and *H. cardiochila* Kraenzl. and should be replaced in that genus.

With regard to *R. occidentalis* the case is as follows. In the *Kew Bulletin* for 1932, p. 191, I described a new species of *Habenaria*, namely, *H. obovata*, which I now find is conspecific with *Roeperocharis occidentalis* and which is really correctly placed in *Habenaria*.

I am also transferring *Amphorchis occidentalis* Lindl. to *Habenaria* under the name *H. occidentalis* (see p. 246). This combination cannot be used also when transferring *Roeperocharis occidentalis* and it is therefore necessary to adopt the name *Habenaria obovata* Summerhayes for the latter. The trivial " occidentalis " was used by Lindley for his *Amphorchis* long before Kraenzlin described his *Roeperocharis*. This arrangement avoids the necessity for creating a further new name.

Satyrium occultum *Rolfe* in Dyer, Fl. Trop. Afr, **7,** 273 (1898). *S. zombense* Rolfe, l.c.

I can find no satisfactory specific differences on examining the two type specimens of these species and the other material which has been added since. The relative measurements of the length and breadth of the lip depend a great deal on the degree to which the apical recurved portion is developed ; this varies considerably even on flowers from the same individual. The degree to which the bracts project beyond the flowers is also a variable character. The rostellum, which is perhaps the most important diagnostic character in *Satyrium*, is identical in the two species. This is otherwise in *S. Nuttii* Rolfe, which is very similar to the above species in general facies, but in which the rostellum is markedly different, the middle lobe being deeply cleft. It is hardly correct to describe the rostellum as bilobed (as in the Flora of Tropical Africa), since that obscures the very definite relationship between *S. Nuttii* and *S. occultum*.

Disperis cordata *Summerhayes* sp. nov. ; affinis *D. togoensi* Schltr. a qua foliis et bracteis multo majoribus, labelli appendicibus longioribus a labello angulo acuto neque recto divergentibus differt.

Herba terrestris, parva, usque 7 cm. alta ; tuber elongato-ovoideum, 1–1·5 cm. longum, 5 mm. diametro. *Caulis* gracilis, teres, 2–3-phyllus. *Folia* alterna, sessilia, late ovata vel suborbicularia, obtusa, basi cordata, 6–10 mm. longa, 7–10 mm. lata, subcarnosa. *Flores* 5–6, in racemo brevi subcorymboso dispositi ; bracteae foliis similes, ovatae, usque 10 mm. longae et 8 mm. latae ; ovarium pedicellatum gracile, circiter 1 cm. longum. *Sepalum*

intermedium lineare, acutum, 8 mm. longum, 0·6 mm. latum; sepala lateralia oblique semiovata, apicibus divergentia acuta, quadrante basilari connata, 8·5 mm. longa, 4 mm. lata, infra medium margines interiores versus breviter saccata. *Petala* semi-ovata, acuta, margine posteriore recta, anteriore basi dilatata, 8 mm. longa, 2–2·2 mm. lata, sepalo intermedio agglutinata cucullum leviter concavum basi cordatum formantia. *Labellum* in toto 5 mm. longum, basi columnae per 2 mm. adnatum, superne lineare, apice in laminam orbicularem, 1·5 mm. longam, 2 mm. latam, media basi lamella erecta quadrata instructam dilatatum, ungue supra columnam appendicibus duabus anguste linguiformibus 1·5 mm. longis papillosis ab ungue angulo acuto divergentibus instructo. *Columna* 1·75 mm. longa. *Rostelli* lobus intermedius orbicularis; brachia lateralia 1·5 mm. longa.

S. NIGERIA. Bamenda District, Bum, in grassland at edge of forest, 4000 ft., April 1931, *Maitland* 1519 (type).

In the structure of the flowers, especially the lip, the species is evidently an ally of *D. togoensis* Schltr. and *D. Johnstoni* Rchb. f. From the latter it is readily distinguished by the much dilated lower portion of the petals as a result of which the galea composed of the joined dorsal sepal and petals is cordate at the base instead of cuneate as in *D. Johnstoni*. *D. togoensis* Schlt. is a very slender plant with extremely small leaves and bracts whereas in *D. cordata* these are both well developed. There are also small differences in the lip structure.

Disperis Mildbraedii *Schltr.* in Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1910–11, **2**, 180 (1922), nomen; affinis *D. nemorosae* Rendle et *D. kamerunensi* Schltr., a quibis petalis apice aristato-acuminatis, labelli limbo duplo breviore, appendice inferne erecta galeae apicem versus subito inflexa biloba lobis papillosis distinguenda.

Herba terrestris, erecta, gracilis, glabra, circiter 15 cm. alta. *Caulis* strictus vel leviter flexuosus, teres, basi cataphyllo vaginante acuto instructus, supra medium bifoliatus, apice 1–3-florus. *Folia* subopposita, inaequalia, breviter petiolata, ovata vel triangulari-ovata, breviter acuminata, usque 4 cm. longa et 3 cm. lata. *Bracteae* lanceolatae, acuminatae, usque 1·4 cm. longae et 6 mm. latae. *Flores* erecto-patentes, albi; ovarium pedicellatum 1–1·5 cm. longum. *Sepalum* intermedium lineare, acutum, supra medium subito inflexum, in toto 2·8 cm. longum, 1 mm. latum; sepala lateralia oblique obovata, rotundata, 11 mm. longa, 5·5 mm. lata, margines anteriores versus breviter acute saccata. *Petala* basi late rotundato-auriculata, apice aristato-acuminata, sepalo intermedio agglutinata galeam superne cylindricam, obtusam, inferne apertam, antice acute trilobam, 1·6 cm. longam formantia, petalorum acuminibus liberis 4 mm. longis. *Labellum* basi columnae per 4 mm. adnatum, supra columnam lineare, 6 mm. longum, apice obtuso gibbiformi 0·5 mm. longo terminatum, prope hunc apicem facie

superiore appendice erecta 7 mm. alta galeae apicem versus subito inflexa biloba lobis pendulis ligulatis subcarnosis papillosis 3·5 mm. longis instructum. *Columna* teres, 4 mm. longa; rostelli brachia gracilia, leviter flexuosa, 1·5 mm. longa.

FERNANDO PO. Peak of Sta Isabel, north side, above Basilé, in mountain forest, 3670–4670 ft., Aug. 1911, *Mildbraed* 6312 (type in Berlin Herb.).

An ally of *D. nemorosa* Rendle, *D. Anthoceros* Rchb. f. and *D. kamerunensis* Schltr. from each of which it differs in the detailed structure of the lip. Above the column this is erect and enclosed in the galea, but the lip proper terminates in a small papillose knob not far above the apex of the rostellum. The appendage continues the lip in an almost straight line into the galea being sharply incurved at the apex and then bilobed. The most striking feature about *D. Mildbraedii*, however, is the aristate acuminate ends to the petals, these projecting forwards from the front base of the galea like two horns.

Vanilla ramosa *Rolfe* in Journ Linn. Soc. Bot. **32,** 457 (1896). *V. ovalifolia* Rolfe, l.c.

Examination of the type specimens shows that apart from flower size there are no essential differences between these two species. All the indications suggest that the type of *V. ovalifolia* possesses only incompletely developed flowers which are thus smaller than the fully opened ones in *V. ramosa*. I have, therefore, adopted the name *V. ramosa* for this species, although since the inflorescences are not always branched the name is not very suitable. It should be noticed that the crest on the lip is formed of the same number of scales (4–5) in each specimen. (Compare with descriptions in Flora of Tropical Africa **7,** 177–178.)

XXXIII—MISCELLANEOUS NOTES

New Shelter in Cambridge Cottage Garden.—Some months ago a representative of Messrs. English Brothers of Barnard's Wharf, Rotherhithe, one of the subsidiary interests of Messrs. Gabriel Wade and English, Timber Merchants, Aldwych House, called at Kew to discuss a project the firm had in view in connection with the importation of Western Red Cedar (*Thuja plicata*) from British Columbia for the erection of houses, summerhouses, etc., built entirely from this wood. In the course of conversation the possibility of exhibiting shingles or a model of a building in the Kew Museums was discussed, and finally an alternative offer was made by the firm to erect a shelter for the use of visitors to Kew. The offer was gratefully accepted and the building was erected in February of the present year.

The value of Western Red Cedar wood for building purposes, and particularly for the manufacture of shingles, has long been recognised in British Columbia, for the wood untreated by preservatives has a very long life when fully exposed to weather changes.

The resistance of the wood to decay is referred to by H. N. Whitford and R. D. Craig in " Forests of British Columbia," p. 197, in the following words :—" Old cedar windfalls, that fell centuries before Columbus discovered America, are still sound, except for the sapwood, though another generation of forests has grown to maturity on top of them. Though, on account of the thinness of the bark, it is very easily killed by fire, cedar sustains perhaps less damage, commercially, from fire than any other coast species. This is due to the fact that the wood in the fire-killed trees, whether standing or down, remains sound for many years."

The Kew shelter is built to a design supplied by Mr. J. H. Markham of His Majesty's Office of Works. It is octagonal in shape, boarded on five sides with sawn weather boards, and panelled internally with prettily grained boards which form a back for comfortable seating for ten persons. The roof is covered with hewn shingles and the whole building has a very pleasing effect in a setting of trees and herbaceous plants.

A further test of untreated wood of Western Red Cedar is being made in the Orchid Houses at Kew, where staging was constructed over a year ago in order to find out how it withstood the trying conditions of constant heat and moisture in comparison with wood of Scots Pine and Teak.

Florida Wild Life.*—This book consists of a series of essays written in popular style on the natural history of Florida. The greater part of the volume deals with plant life. One chapter is devoted to sea-shells and one to fishes, while several are concerned with questions of climate. The opening chapter entitled " A Tree that Walks " deals entirely with the " Mahoe " (*Hibiscus tiliaceus*) and some interesting observations on this well known tropical species are recorded, its method of rapid vegetative increase being illustrated by photographs. Miscellaneous plant communities and growth forms are then described. These include littoral plants, epiphytes, swamp-plants, vines and weeds.

In the discussion on weeds the author refers in indignant terms to the number of European species that are now troublesome on the American continent. He states, *inter alia*, that " Europe is the great weed factory of the world. She has not only filled the Orient with her vile tatterdemalion army but has plenty of representatives all through South and Middle America as well as the West Indies, while the whole of the United States and most of Canada are to-day overrun with her renegade plants." In more gleeful strain the author then draws consolation from the fact that species of *Agave* and *Opuntia* introduced from America as ornamental plants are now troublesome in parts of the Mediterranean region and remarks—" We don't like to be too far behind in the matter of exchanging

*By Charles T. Simpson. Macmillan & Co., Ltd., London, 1932, pp. xvi+199, illustrations 40. Price 12*s.* 6*d.* net.

plants." It is questionable whether the Old or the New World has the more cause for complaint from this " exchange." Many of the worst agricultural pests in the warmer regions of the Old World are of American origin, and one need but instance certain species of *Galinsoga, Tagetes, Ageratum, Bidens,* and *Alternanthera.*

Many statements throughout the book, particularly in the chapters on Epiphytes and Evolution of the Leaves, are open to question. In some instances the plants intended are loosely or wrongly named, which is regrettable, *e.g.*, the " Sea Bean " (*Entada scandens* Bth.) is referred to as *Mucuna.* However, as the book is written in a light and chatty style and with considerable humour, it is no doubt intended more for the general reader than for the serious student. F. N. H.

Botanical Magazine.—Part 2 of vol. 156, which was published on April 1st, contains the following plant portraits :—*Meconopsis grandis* Prain (t. 9304), a native of the Sikkim Himalaya, and Tibet, E. of Mt. Everest ; *Eriolobus trilobatus* Roemer (t. 9305), from the orient ; *Cistus crispus* Linn. (t. 9306), a native of the W. Mediterranean basin ; *Sigmatostalix radicans* Reichb. f. (t. 9307), from southern Brazil ; *Euonymus nanus* M. Bieberstein (t. 9308), an interesting little bush spindle, native in S.E. Europe, Turkestan, N. China and Mongolia ; *Acacia Baileyana* F. Mueller (t. 9309), the well-known, grey-leaved species of southern New South Wales ; *Rhododendron Genestierianum* Forrest (t. 9310), found by the late George Forrest in N. W. Yunnan and Tibet ; *Gentiana prolata* Balf. f. (t. 9311), a native of Sikkim and Bhutan ; *Calceolaria picta* Philippi (t. 9312), restricted to the Coquimbo province, Chile ; *Daphne aurantiaca* Diels (t. 9313), discovered by Forrest in the Lichiang range, N.W. Yunnan, and *Globba Winitii* C. H. Wright (t. 9314), from Siam.

Corrigenda.—In *K.B.* 1933, 143, line 5, " *Gnidia clutyoides* " should read " *Gnidia cluytioides.*"

In *K.B.* 1933, 150, line 10, the phrase " comb. nov." should be omitted, the combination having already been made in *K.B.* 1932, 85.

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